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ABSTRACT

This study sought to develop new measures of children's understanding and tolerance of affective qualities, and to relate those variables to the development of an aesthetic orientation toward visual art. The use of these new measures in the present research leads to the following conclusions: (1) No regular age change appears in the correlation among individuals between liking for a picture and recognition of its affective qualities; (2) With increasing age, affective qualities of pictures are recognized with greater accuracy and questionnaire measures of general tolerance for ambiguity, complexity, emotion, and novelty increase very markedly; (3) On most of the pairs of pictures presented for children's choices, previous findings that the tendency to prefer the work experts consider aesthetically better increases with age; (4) Tolerance of affective qualities of pictures is, within each sex and grade group, positively correlated with the questionnaire measures of general tolerance for ambiguity, complexity, emotion, and novelty; (5) Measures of preference for art considered aesthetically better by experts are, in the 12th grade, positively related to all of the other measures. (Author/CK)

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FINAL REPORT
Project No. 9-0029
Grant No. OEG-1-9-160029-0100-010

ASSESSMENT OF AFFECTIVE RESPONSES CONDUCIVE TO ESTHETIC SENSITIVITY

Irvin L. Child
Yale University
New Haven, Connecticut 06510

January 1971

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CONTENTS

	Preface	2
	Summary	3
I.	General background	5
II.	Specific plans	8
III.	Subjects	8
IV.	Instruments used: Description and Reliability	10
V.	Differences among age groups	25
VI.	Correlations among variables	29
VII.	Conclusions	33
VIII.	Recommendations	34
	Appendix A	35
	Appendix B	49

TABLES IN TEXT

Table 1	Measures based on questions about pictures: internal consistency	13
Table 2	Questionnaire measures of tolerance for affective experience: Internal consistency and relation among measures	20
Table 3	Art pair preference: Internal consistency and relation among measures	23

PREFACE

I am profoundly grateful to the pupils, teachers, and school administrators of the several communities where data were gathered in this study, for their indispendable assistance and cooperation. In particular, I am most indebted to Ruby Claire Ball of the West Virginia State Department of Education, to Libby Caligan, Art Supervisor, and Mary Earnest Shelton, Art Coordinator, in the school of their separate counties, for their most generous and friendly invitation to conduct the main study in West Virginia, and for their ability to maintain this generosity and friendship through all the strenuous efforts occasioned by the research; and to Dr. Frank Yulo for his similar help in arranging for the pre-tests in Connecticut.

I am grateful to Rosaline S. Schwartz for her invaluable assistance in selecting and preparing test materials and for conducting the pre-tests, and to Alice B. Child for her assistance in conducting the main study.

Summary

This study sought to develop new measures of children's understanding and tolerance of affective qualities, and to relate those variables to the development of an esthetic orientation toward visual art.

New measures were developed of understanding and tolerance of affective qualities of pictures, and a questionnaire was assembled to measure general tolerance for ambiguity, complexity, emotion and novelty. Esthetic orientation toward art was assessed by a measure previously developed, in which children's preferences in art are compared with expert judgments about esthetic merit. These measures were applied to about 2000 school children, mostly in secondary school but including a few in fifth and sixth grades.

The measures developed here do not, in their present form, have sufficiently high internal consistency to warrant their practical use in evaluation of individual performance. They are in their present form useful only for research on group differences and on relations among variables. Their use in the present research leads to conclusions stated in the following paragraphs.

No regular age change appears in the correlation among individuals between liking for a picture and recognition of its affective qualities.

We found evidence, valid only for some of the items used, that with increasing age affective qualities of pictures are recognized with increasing accuracy, and directly expressed tolerance of these affective qualities increases.

With increasing age, questionnaire measures of general tolerance for ambiguity, complexity, emotion, and novelty increase very markedly.

On most of the pairs of pictures presented for children's choices, we confirm previous findings that tendency to prefer the work experts consider esthetically better increases with age. On some pairs where the esthetically poorer work has especially strong popular appear, however, an opposite change with age appears; that is, preference for the esthetically poorer work actually becomes more nearly unanimous.

Tolerance of affective qualities of pictures is, within each sex and grade group, positively correlated (average r, .19) with the questionnaire measure of general tolerance for ambiguity, complexity, emotion, and novelty. Both these measures (but especially the latter) are also correlated with recognition or understanding of affective qualities of pictures (average r, .10 and .20 respectively).

Measures of preference for art considered esthetically better by experts are, in the 12th grade, positively related to all of the other measures: understanding of affective qualities of pictures, tolerance of affective qualities of pictures, and general tolerance of affective qualities. In lower grades, these relations are not dependable, but occur in some groups. Certain pairs of pictures, where the esthetically poorer work has especially strong popular appeal, even show an opposite relation to these other measures in the earlier years of secondary school.

The present research, therefore, suggests that increasing understanding and tolerance of affective qualities is one, but by no means the only, important factor underlying the development of an esthetic orientation in some children during the secondary school years.

ASSESSMENT OF AFFECTIVE RESPONSES CONDUCIVE TO ESTHETIC SENSITIVITY

I. General background

Art means many and, frequently, different things to different people. Art education needs to recognize the diversity of these meanings if it is to help bring out the full potential of art for enriching the lives of the widely different people in our society.

Yet among the many meanings of art, some certain ones may merit a distinctive and particularly significant place in art education. A special place seems appropriate for the meaning given to art by those people for whom art is especially important. The term esthetic has long been applied to that approach to art taken by people with the most profound and lasting interest in it. The term seems equally suitable today.

In the present research we have attempted to develop some techniques that can be used to assess in school children how far their experience of art manifests the affective characteristics which appear to be associated with experience of an esthetic nature. More specifically, we have developed procedures intended to indicate the extent to which school children's experiences of art include a genuine recognition of ambiguity, complexity, emotion, and novelty and a tolerance of the challenge posed by each of these. Since this recognition and tolerance seem central to esthetic appreciation, our procedures are thus directed at assessing the extent to which school children's experiences of art are of a kind especially conducive to esthetic appreciation.

This work grows out of our previous research and current thinking about the arts of which that research is a part. In agreement with the meaning of esthetic already suggested, esthetic orientation has in this research been defined empirically, referring to the reaction of people who devote their lives to art as full-time students or professionals. Taking their evaluative reactions as expert standards, we have compared with these standards the responses of other persons. Individuals from the general population could then be assessed for the degree to which their art preferences resemble or agree with expert evaluations. This measure may be considered esthetic sensitivity, or degree of tendency to respond to art in an esthetic manner.

In our past research, variations in esthetic sensitivity have then been studied in relation to personality characteristics in order to arrive at inferences about the kinds of personal satisfactions obtained by those who most ardently pursue esthetic interests. The outcome of this research has been summarized as follows:

> The results fall into a pattern suggesting that agreement with experts is in large measure an outcome of a general cognitive approach to the world, an approach involving search for complex and novel experience which is then understood and evaluated through relatively autonomous interaction of the individual with objects providing such experience. The questionnaire items most regularly correlated with extent to which a person's art preferences agreed with expert judgment fall into three categories: Barron's independence of judgment scale, David Singer's scale for regression in the service of the ego, and a third set of items referring to tolerance of complexity, unrealistic experience, ambiguity, and ambivalence. Items in all three categories were later translated into Japanese by Sumiko Iwao and were found to have similar correlations in male undergraduates in Japan. Except for regression in the service of the ego, similar correlations were also obtained in secondary-school students of both sexes in the United States.....The indication is that the satisfactions obtained by...artistic appreciation.... [are those of] independent mastery over challenges posed by complex stimulation from without and complex memories, images, and impulses from within.
>
> (Child, 1967)

This view of the personal function of art resembles some views that have developed from humanistic studies. In particular, it is very similar to the theory presented by Peckham in his book, Man's rage for chaos (1965). Peckham argues, largely on evidence drawn from the history of stylistic change, that the function of art is to give the individual practice in responding to novelty so that he will adapt more successfully to the challenge of environmental changes. A similar function is presented by the art educators Lowenfeld and Brittain (1964, ch. 1) as an important part of the role of children's creative art activities play in their general education.

Our research on personality correlates of esthetic sensitivity also suggests, though with less direct evidence, that esthetic sensitivity depends upon ability and willingness to confront fully the emotional side of life, to face and deal fully with even very unpleasant emotion. This suggestion arises from the fact that esthetic sensitivity is found correlated with awareness of anxiety in oneself and with a measure of "regression in the service of the ego," which includes as components recognition and acceptance of unpleasant emotion. The same implication also emerges from our research on reasons given by school children for their likes and dislikes in art, and from direct analysis

of the characteristics of art children like and dislike (Child et al., 1967). Both these approaches indicate that sentimentality--a deflection of genuine emotional response--appeals to those lacking in esthetic sensitivity, and that genuine and frank emotionality appeals to those more sensitive esthetically. Here, too, is research confirming through its particular techniques inferences long familiar from humanistic studies. It also shows an interesting agreement with some of the correlates of creativity established by the Berkeley personality studies of more versus less creative persons in several professions including architecture and literature (Barron, 1963, 1969; MacKinnon, 1965). Originality and an esthetic orientation both seem related to openness to emotional experience, even to very unpleasant emotion.

The direction of causal relation between emotion and esthetic orientation may be multiple. Esthetic experience may help make one more open to the potentialities of emotional life in general; and if it does, this may be a highly valuable contribution art education can make to the general fullness of one's life. More important in planning this research, though, was the equally plausible notion that depth of emotional experience may contribute to the possibility of esthetic experience. A certain openness to emotion may be a prerequisite for esthetic appreciation, even if the degree of openness may then in turn be increased by varied esthetic experience.

Esthetic appreciation of art, then, may be a route by which the individual obtains mastery over the challenges of novelty, complexity, and ambiguity, and faces emotion and responds to its challenge too. For a person's experience of art to serve him in these ways, the experience must, it would seem, involve novelty, complexity, ambiguity, and emotion. If his experience of art lacks these features--at least if it uniformly lacks them--it can hardly be the kind that permits esthetic appreciation. Some art to which a person might be exposed may intrinsically lack the possibility of affording him such experience; it may be too routine and familiar, too simple, too sentimental, to permit challenging experience.

But exposing a person to art which can offer challenging experience does not in itself guarantee that he will have such experience. He may shut himself off from seeing the complexities, he may disregard all features not familiar and realistic, he may miss the emotional meaning the artist intended. What determines whether, confronted with art capable of arousing and gratifying esthetic interest, a person actually will experience it in the appropriate way? Where do those personality characteristics come from which favor the occurrence of esthetically relevant experience? As we have already said for emotional experience in particular, the directions of causation here can be various. Perhaps an appropriate experience of art merely permits the expression of personal

tendencies already developed in other ways. It may be, however, that appropriate experience of art is itself an important contributor to the development of those tendencies. In either event experiencing art in a way appropriate to esthetic appreciation seems to be one desirable objective of art education; and assessment of such experience is therefore an important research aim.

II. Specific Plans

Our basic intent was to develop measures of children's affective experience and response when looking at works of art, measures possibly relevant to esthetic sensitivity. To test the relevance of these measures to esthetic sensitivity, it was necessary to measure the latter also. The mutual relevance could be determined by two steps: testing whether measures of affective experience and of esthetic sensitivity would vary with age in a similar way, and testing whether they would vary together for individual differences at a given age. The measure of esthetic sensitivity showed in the rural county where we first worked characteristics somewhat different from what had been expected, and in the urban county where we later worked we were able to increase the diversity of this measure by having access to the pupils for a longer period of time.

In determining whether the affective response to works of art might be entirely specific to art or partly more general, we also used a questionnaire intended to measure tolerance of ambiguity, complexity, emotion, and novelty in contexts other than art. We wished to discover whether these measures would be correlated with the corresponding measures based specifically on response to works of art. Scores from the questionnaire could then also be studied to see whether they varied with age in the same way as did esthetic sensitivity and affective response to art, and to see whether individual differences were correlated with those measures at a given age.

III. Subjects

The new measuring instruments developed for this research were tried out with secondary-school pupils in a Connecticut suburb. The purpose was to determine approximate time required, and procedures desirable, and to observe audience reaction as a basis for selecting among items for final use. There are therefore no results to be reported from this preliminary tryout; they were simply taken into account in planning the final instruments.

The data of the research are derived entirely from work done in the state of West Virginia. Data were obtained in two counties, which we will identify as rural and urban.

In each county an effort was made to study groups which, as closely as possible, would represent children from the same

population at different ages. A source of difficulty we could not control is that increasingly through their secondary-school years some children become unavailable to research done through the public schools.

In the rural county, we tested the entire student body (except for those absent the date we tested) of grades seven through twelve in a school district where the junior high school and the high school cover exactly the same area. The area includes a small town and the surrounding countryside. The main economic resource is coal mining. The mines and related activities employ today many fewer persons than years ago, and the area is in a long-standing economic depression. Many former inhabitants have left; of those who remain many are impoverished and dependence on relief is widespread. The population includes, however, families in a wide range of economic circumstances.

All data obtained from grades nine through twelve in the rural county could be used. Lighting conditions under which the seventh and eighth grades were tested, however, were sufficiently poor in comparison with those of the other grades that it was decided not to analyze the data from response to pictures in these two grades; the unwanted light was so strong it markedly changed the view of the pictures. Questionnaire data were not affected by the lighting and so were analyzed despite the lack of information about pictures.

We also have from the rural county a small amount of data from children of the fifth and sixth grades. It was not feasible at this age level to study the entire population corresponding to the secondary schools we used. Our sample of fifth and sixth grade children is divided about equally between a part of the area covered by the secondary-school district we used and parts of two other secondary-school districts in the same county. These grade-school data will be used only in a limited way; they may give some valuable indications even though they cannot be trusted to be comparable with the secondary-school data in population represented.

The urban data were obtained in one of the largest cities in the state. We studied the entire twelfth grade of one of the two high schools in the city, and the entire seventh grade of four junior high schools, all or some of whose pupils live within the district of this high school. There is a fifth junior high school from which a very few children go on to this high school, and we did not test there. Two of the junior high schools cover neighborhoods that are entirely within the area of this high school. The groups we selected as best representing the same population at different ages consisted of all seventh grade children in those two junior high schools and all the twelfth grade children who

were living within the district covered by those two junior high schools. It happens that the districts of these two junior high schools include many of the neighborhoods of the highest socio-economic status in the city. So our main sample here differs from that of the rural county not only in being city-dwellers but also in average socio-economic status. We have made supplementary use of the much smaller number of twelfth grade children who came from the other two junior high schools, and of all the seventh graders in those two. These other two junior high schools have districts only partly overlapping the district of the high school tested.

Testing conditions were excellent in both counties, with the exception of the lighting problem already mentioned. The school authorities and staff cooperated fully, so that we were well introduced and some school personnel were always in the room as a help if needed to maintain good order. In addition, the children seemed generally interested in our project, and worked with us with good will. Only a very small number of papers had to be discarded because of misunderstanding instructions or unwillingness to cooperate.

IV. Instruments Used: Description and Reliability

This section describes the research instruments used, mentioning results only so far as necessary for full description of the instruments. For all instruments used in assessing individual differences, findings on reliability are essential to full description and hence are provided here. For the instruments used in assessing individual differences in understanding and responding to affective qualities of pictures, selection of items for final scoring was based on information about age changes, and for that reason certain results on age change are also mentioned in this section. With these exceptions, results are instead presented in later sections.

1. Understanding and responding to affective qualities of art.

Twenty-six single pictures of works of art were selected on the basis of the Connecticut tryout, to test aspects of understanding and responding to affective qualities of works of art. These 26 pictures are listed and described in Appendix A. The 26 pictures were shown as projected slides, always in the same standard order, to all subjects. The subjects were provided with question and answer forms, a sample of which also appears in Appendix A. To each picture they first responded by rating like or dislike on a 7-point scale, and then by answering specific questions about how they understood the picture. These questions numbered a total of 111. Some of the results presented in a later section consider how understanding of a picture, assessed by these questions, was related to the like vs. dislike rating.

While considering age changes in response to single pictures, in order to select items to measure individual differences, we looked at the 111 separate questions, and at three additional measures. One of these three was a difference between two items out of the 111. A second was the sum of two out of the 111 items. The third was independent of the questions, based instead on a difference between two of the ratings. Thus, 114 items were considered, or 112 completely independent items.

For 73 of these 114 items, we had some definite prediction about the direction of change with age, believing one particular response most indicative of mature understanding of the pictures. The remaining questions had been included without any specific prediction, sometimes to make similar the form of questioning about different pictures, and sometimes to uncover possible age changes even where we did not expect them. Of the 73 items where we predicted a change with age, 49 were items intended to assess understanding of emotional aspects of the pictures. Ten were items intended to assess tolerance of complexity (including one of the items based on putting together two questions). Three pertained to tolerance of ambiguity. Nine pertained to tolerance of novelty. Finally, only two of the compound items, one based on two specific questions and the other on two specific ratings, pertained to tolerance of emotion.

We explored age change by looking at change in four specific groups. One group comprised the boys, another the girls, of the rural county samples that most nearly represented a comparable population at different ages. For each sex, we averaged the results for eighth and ninth grades, and averaged the results for eleventh and twelfth grades. (We thought it more appropriate to give each grade equal weight, rather than weighting them according to the number of persons in the sample.) We then took the direction and magnitude of difference between these two averages as an indicator of age change. A third group comprised the boys, and the fourth group consisted of the girls, of the urban sample for which, again, we had the closest approach to a comparable population at different ages. Here we compared the seventh graders in two junior high schools with the twelfth graders in the district of those two junior high schools. As we will indicate below, we supplemented the information on these four groups, for certain limited purposes, with information on fifth and sixth grade children in the rural county. We will consider the way we selected among the items for which we had made a prediction and add to them certain items for which we had not made a prediction, in order to arrive at a final group of items selected on the basis of age change.

a. Assessment of understanding of affective qualities of art.

As indicated above, we made an advance prediction about age change on 49 items intended to assess understanding of affective qualities of works of art. On 13 of these 49 items, our prediction was consistently confirmed--that is, response changed with age in the direction we had predicted in each one of the four groups. We put all 13 of these items together as a measure of understanding for which predicted age changes had been well validated. This measure appears in Table 1 as variable 1 (UND, 4 CON, i.e. items on understanding with four confirmations of predicted age change).

For an additional nine items the advance prediction was clearly confirmed in three out of the four groups. For two of these nine items the change was small where it was in the predicted direction, but large in the group showing contrary results; we therefore omitted these two items. For a third item, the confirmations were small and their direction was not confirmed when we looked at the grade school results (fifth and sixth grade) available for the rural county. This item was therefore also omitted, leaving six items to be put together for a measure of understanding for which predicted age changes had been only moderately well validated. This measure appears in Table 1 as variable 2 (UND, 3 CON, i.e. items on understanding with three confirmations of predicted age change).

At the other extreme, on four items of the 49 on which we had made predictions, our prediction was reversed separately in each of the four groups. We decided to look at these four, scored in the direction indicated by the observed facts rather than by our prediction, in case the facts were based on an accuracy of perception on the part of many children which we had not been able to share. These four items formed a separate measure of understanding on which predicted age changes had been reversed. This measure appears in Table 1 as variable 4, (UND, REV, i.e. items on understanding with uniform reversal of predicted age change).

Among the 58 items for which we had made no definite prediction, nine showed a uniform direction of change with age in all four groups and seemed to us, after the fact, possibly pertinent to include as indicative of understanding. These became a separate measure of understanding derived purely empirically. This measure appears in Table 1 as variable 3 (UND, EMP, i.e. items on understanding, selected by age changes obtained empirically though not predicted).

We thus ended up with 32 items on understanding, validated in one way or another by the results on age change, and scored in four separate sets. The internal consistency of each of these sets of items as a measure of variation from one individual to another,

Table 1

Measures based on questions about pictures: internal consistency (as measured by the alpha coefficient) for various groups

Variable	Number of items	Rural data: Boys in grade 9	10	11	12	Rural data: Girls in grade 9	10	11	12	Urban data: Boys: Schools with complete data 7	12	Boys: Other schools 7	12	Urban data: Girls: Schools with complete data 7	12	Girls: Other schools 7	12
N		107	110	63	74	101	110	125	116	189	108	137	34	157	124	125	39
Understanding																	
1. UND,4CON	13	.47	.16	.34	.43	.35	.45	.44	.48	.33	.46	.29	.45	.46	.49	.25	.36
2. UND,3CON	6	.21	.09	.01	.21	.09	.29	.11	.13	.14	.00	.04	.00	.15	.02	.03	.00
3. UND,EMP	9	.15	.11	.12	.00	.31	.27	.17	.00	.15	.20	.08	.14	.21	.11	.24	.00
4. UND,REV	4	.00	.00	.00	.00	.00	.16	.00	.00	.00	.04	.00	.14	.00	.00	.00	.11
Response																	
5. PICAMB	2	.00	.00	.00	.21	.00	.00	.17	.27	.06	.04	.05	.15	.11	.17	.00	.23
6. PICCOM	4	.64	.67	.59	.65	.67	.64	.63	.69	.62	.59	.69	.47	.73	.65	.68	.44
7. PICEMO	2	.00	.00	.38	.00	.08	.00	.01	.06	.14	.02	.00	.00	.20	.00	.00	.00
8. PICNOV	5	.25	.33	.09	.04	.00	.18	.29	.34	.25	.00	.21	.28	.25	.00	.17	.08
9. PICTOLTOT	13	.46	.46	.59	.49	.52	.52	.46	.54	.38	.43	.43	.40	.60	.42	.41	.37

is presented in the pertinent lines of Table 1 in the form of the alpha coefficient (which is equivalent to the mean of all the reliability coefficients obtainable by different split half scorings). Only for the first of the four measures, the one derived by the double criterion of advance prediction and strong confirmation by observed fact, do the various groups of subjects regularly show some usable degree of internal consistency among the items. The coefficient of consistency for this variable averages .39--a value indicating that this measure cannot provide dependable assessment of individuals but can be used with caution as a research tool in the study of group differences and of correlations among variables.

The 13 items we retained to form the measure of understanding on which we will later report results appear in the list below. Each question is followed by the answer scored as indicative of understanding.

1. Do you think this picture (Munch's Anxiety) is happy? No

2. Do you think this picture (Munch's Anxiety) is puzzling? Yes

3. Does this picture (Munch's Anxiety) tend to make you feel anxious or fearful? Yes

4. If you were asked to write a story about this photograph, (Dorothea Lange's Bad Trouble) what would come to mind? Several stories

5. Do you think the little girl (in Schiele's Austrian Girl) is interesting? Yes

6. Do you think the little girl (in Schiele's Austrian Girl) is thoughtful? Yes

7. Do you think the man shown here (in Barlach's Man Singing) is angry? No

8. What feelings do you think the artist was trying to express (In Kojimo's Untitled Abstract); Anger? Yes

9. Do you think this picture (Suzuki's Abstract) is amusing? No

10. Do you think this picture (Suzuki's Abstract) is angry? Yes

11. Do you think this picture (Suzuki's Abstract) is happy? No

12. Do you think this picture (Suzuki's Abstract) is tender? No

13. Do you think the person shown here (In Barlach's Horror) is sad? Yes

b. Assessment of response to affective qualities of art.

For assessing response to affective qualities of works of art, we attempted to develop separate measures of tolerance of ambiguity, tolerance of complexity, tolerance of emotion, and tolerance of novelty; as will be seen, we were not entirely successful. Here too we formulated in advance some predictions, and also scanned the results for age changes for all items of possible relevance. The procedures we followed in establishing our final measures differed somewhat from those followed for the measure of understanding, however, because fewer items were available here. The number and nature of the items will be indicated below in describing our attempts to form four separate measures.

Tolerance of ambiguity. For tolerance of ambiguity none of the three predictions we had made about age change on specific items were confirmed in all four groups of subjects. Among the items on which we had made no prediction, however, two showed uniform direction of change in all four groups and appeared on inspection to justify being classified under tolerance of ambiguity. Our score for tolerance of ambiguity thus consists only of these two purely empirical items: finding the style of the Turner painting not amusing (item 14 in the question and answer form in Appendix A) and finding the ambiguity of the Tchelitchew drawing not strange or weird (item 84). This measure appears in Table 1 as variable 5 (PICAMB, i.e. picture measure of tolerance of ambiguity), and the items are presented as numbers 2 and 8 in the list at the end of this section.

Tolerance of complexity. Out of the ten predictions made about age change in tolerance of complexity, four were confirmed in all four groups. There were no additions from the items for which we made no predictions. The four items derive from only two different pictures. One item consists of saying that multiple-exposure photographs, such as that by Kesting, are not boring (item 134). The other three were all based on the Tchelitchew drawing: liking it better for seeing it different ways (item 80), finding such pictures not annoying (item 82), and finding such pictures interesting (item 83). This measure appears in Table 1 as variable 6 (PICCOM, i.e., picture measure of tolerance of complexity), and the items appear as numbers 5, 6, 7, and 12 in the list at the end of this section.

Tolerance of emotion. The two predictions we had made about age changes in tolerance of emotion were not confirmed uniformly; but among the items for which no predictions had been made, two that gave consistent age changes seemed to be classifiable as tolerance of emotion. These were finding the young woman of the Peters picture not interesting (item 12, judged relevant on the grounds that such a judgment is based on finding the picture vapid or lacking in emotional significance), and finding the Munch painting interesting (item 33, judged relevant on the grounds that the picture has an emotional impact that can hardly be missed). This measure appears in Table 1 as variable 7 (PICEMO, i.e., picture measure of tolerance of emotion), and the items are numbers 1 and 4 in the list at the end of this section.

Tolerance of novelty. Among nine items for which predictions had been made of increased tolerance of novelty with age, two (items 16 and 92) led to consistent confirmation of the prediction throughout the four groups. One of the remaining seven items had the prediction disconfirmed in each of the four groups, and on considering this outcome we persuaded ourselves that there might be a complex route by which this opposite response could indicate tolerance of novelty. (We had expected tolerance of novelty to be indicated by finding the unconventional representation of a landscape by Marin exciting, in item 89. When with increasing age Marin's landscape was increasingly found to be not exciting, we reasoned that conceivably the novelty is increasingly accepted and no longer found exciting even though it might be liked.) In addition, two of the items for which no prediction was made yielded a consistent result for each of the four groups, and seemed classifiable under tolerance of novelty. One was finding the Marin landscape not amusing (item 86) and the other was finding the Kesting multiple exposure not irritating (item 136). Thus we arrive at five items for tolerance of novelty. The measure they comprise appears in Table 1 as variable 8 (PICNOV, i.e., picture measure of tolerance of novelty), and the items are numbers 3, 9, 10, 11, and 13 in the list at the end of this section.

The internal consistency of these four specific measures of response to affective qualities of art is presented in the pertinent lines of Table 1. The outcome is not very satisfactory; the only measure with uniformly good internal consistency is tolerance for complexity, and that measure draws three of its four items from response to a single picture. Since the four measures tend to be correlated with each other, we decided to pool the four sets of items into a single overall measure of tolerance for affective qualities of art. For this overall measure the internal consistency is reasonably satisfactory, as indicated by Table 1 entries in the line labeled for variable 9, PICTOLTOT (i.e., Picture Measure of Tolerance: Total). The coefficients average ,47, a higher figure than for the overall measure of understanding though

still not high enough to justify any use of the measure for individual assessment. We have also retained the four specific measures, in case differences among them might be pertinent in considering results.

Here we bring together the 13 items which make up the overall measure of tolerance of affective qualities of pictures. Each question is followed by the answer scored for tolerance, followed in parenthesis by the name of the variable the item was assigned to.

1. Do you think the woman (in Peters' Lady Elizabeth) would be an interesting person to know? No. (Tolerance of Emotion).

2. Do you think this way of presenting the subject (Turner's presentation of a train coming toward us through the rain) is amusing? No. (Tolerance of Ambiguity).

3. Do you think this way of presenting the subject (Turner's presentation of a train coming toward us through the rain) is clever? Yes. (Tolerance of Novelty).

4. Do you think this picture (Munch's Anxiety) is interesting? Yes. (Tolerance of Emotion).

5. How do you feel about the fact that this picture (Tchelitchew's Hand into Foot into Tree) can be seen several different ways? Does it make you like the picture more or less? More. (Tolerance of Complexity).

6. Does this kind of picture (Tchelitchew's Hand into Foot into Tree), that can be seen several different ways, seem to you annoying? No. (Tolerance of Complexity).

7. Does this kind of picture (Tichelitchew's Hand into Foot into Tree), that can be seen several different ways, seem to you interesting? Yes. (Tolerance of Complexity).

8. Does this kind of picture (Tchelitchew's Hand into Foot into Tree), that can be seen several different ways, seem to you strange or weird? No. (Tolerance of Ambiguity).

9. Do you think this way of presenting a landscape (in Marin's Phillipsburg, Maine) is amusing? No. (Tolerance of Novelty).

10. Do you think this way of presenting a landscape (in Marin's Phillipsburg, Maine) is exciting? No. (Tolerance of Novelty).

11. Would you like the painting (Marin's Phillipsburg, Maine) better if the artist had trimmed the edges in the usual way to make it straight on all four edges? No. (Tolerance of Novelty).

12. Do you find this mixture of several scenes (in a photographic multiple exposure by Kesting) boring? No. (Tolerance of Complexity).

13. Do you find this mixture of several scenes (in a photographic multiple exposure by Kesting) irritating? No. (Tolerance of Novelty).

2. Questionnaire on general tolerance of ambiguity, complexity, emotion, and novelty.

A questionnaire was planned to assess, as general personality characteristics beyond the limited context of art, the same four response tendencies we were trying with our single pictures to assess as responses to the affective qualities of art. For this purpose we were able to draw a number of items (sometimes adapting them for the lower age of our subjects) from previous questionnaires, including Barron's Independence of Judgment scale, the F-scale by Adorno et al., David Singer's scale for Regression in the Service of the Ego, and various scales constructed and used in our earlier research. Most items in these previous questionnaires are not pertinent to the constructs we were now trying to assess. We used only some of those most clearly relevant, and added to them items we especially invented for the present purpose. The preliminary form of the questionnaire contained 48 items, divided into four sets, intended to measure Tolerance of Ambiguity, of Complexity, of Emotion, and of Novelty. Each set consisted of 12 items, subdivided into two subsets of 6 items each, those for Yes and those scored for No.

This preliminary form was included in the advance try-out of our new instruments. This try-out provided us with responses to the questionnaire from four groups of secondary-school pupils: 60 high-school boys (48 from twelfth grade, 2 from eleventh, and 10 from tenth), 67 high-school girls (49 from twelfth grade, 5 from eleventh, and 13 from tenth), 60 seventh-grade boys, and 63 seventh-grade girls. For each of these four groups separately,

correlations were calculated between each item and the total score on the other 11 items intended to measure the same variable, and between each item and the total score on the 12 items intended to measure each of the other three variables.

The selection of items for the final form was based entirely on the correlation of each item with the other 11 items intended to measure the same variable. The four correlations of this kind for each item (one from each of the four try-out groups) were averaged. Out of the six items of each subset, the two items for which this average was lowest were dropped.

For only two out of the 16 eliminated items (one complexity item and one novelty item) did the correlation with the 11 other items of the same variable exceed the highest correlation the item had with any of the other three totals. Of the 32 retained items, on the other hand, 14 had higher correlations with their own variable than with any other (three ambiguity items, one complexity item, six emotion items, and four novelty items). These facts suggest that the try-out permitted us to achieve some real differentiation among the four variables, but not so much as would be desirable.

The final 32-item questionnaire appears in Appendix A as the last two pages of the question and answer form used in the main study in West Virginia. The copy in the Appendix includes a key indicating how each item was scored.

The 32-item questionnaire was administered to all subjects in the final study conducted in West Virginia. The average internal consistency appears for each variable (and for total score on the 32 items) in the diagonal of Table 2. The average intercorrelations among variables appear in the other cells of Table 2. The average of .58 for the consistency coefficient of the total measure indicates a very useful degree of internal consistency for this measure; it is not suitable for stable measurement of individuals, but will be valuable in studying group differences and the interrelation of variables. There is no convincing evidence, however, of really adequate separation of the four specific variables we were trying to distinguish from each other. We will stress results obtained with the total questionnaire measure. The nature of the items, of course, defines it as a measure of tolerance for ambiguity, complexity, emotion, and novelty. The previous history of many of the items justifies our considering it as a general measure of cognitive flexibility and independence.

3. Assessment of esthetic preference.

For assessing esthetic preference or esthetic sensitivity, our general procedure was one developed in earlier research. We

Table 2

Questionnaire measures of tolerance for affective experience: Internal consistency and relation among measures. (For correlations between variables, each entry is the mean of 16 separate coefficients, one for each of the 16 groups identified in Table 1. For internal consistency, presented in the diagonal, more subjects were available, but more coarsely grouped in the urban data; 16 groups are averaged, but weighted to give equal attention to urban and rural data.)

	TOLAMB	TOLCOM	TOLEMO	TOLNOV	PERTOT
TOLAMB	.28	.25	.27	.31	.69
TOLCOM	.25	.18	.17	.20	.61
TOLEMO	.27	.17	.25	.32	.67
TOLNOV	.31	.20	.32	.22	.70
PERTOT	.69	.61	.67	.70	.56

projected pairs of slides; each pair showed two similar works of art (to the extent possible, similar both in subject matter or type and in style) differing in esthetic merit according to the opinion of art students and other adults greatly interested in art. We asked each subject to indicate on the answer form which of the two works of art in a pair he liked better. We scored these responses for the extent to which a person's preferences coincided with the experts' judgments of superior esthetic merit. This measure was then taken as a measure of esthetic preference, or of esthetic sensitivity to visual art--that is, of tendency to prefer the art judged esthetically better by people most interested in art.

For the rural county where we first collected data, we were planning our research to require only one school period, and wished to show only 30 pairs of slides, in order to ensure ample time for the other instruments. The selection of these 30 pairs turned out to be unwise, and we realized that more subject time was desirable for adequate measurement of esthetic sensitivity. We were fortunately able to obtain a double period for working with children in the urban county. To permit as much comparison as possible of data from our two sites, we administered in the urban county the same 30 pairs, and all other instruments, in the same order used in the rural county, but then finished by showing a large number of additional pairs.

In planning the original set of 30 pairs, we had tried to select pairs likely to be especially predictive of total score on a measure of this kind. For a set of 60 pairs, we had item-to-total correlations available from several separate studies with college students, and older adults and we used this information as a basis for selecting items. We were careful to include a set of pairs (19 in number) on which there had seemed to be no consistent tendency for the artistically naive to prefer the picture experts consider poorer, as well as a smaller set (11 in number) of pairs on which the artistically naive markedly prefer the picture considered poorer. This was because of the possibility suggested in an earlier paper (Child, 1965) that these two types of items might measure very different aspects of response to art. When we analyzed the data from the rural county in West Virginia, however, we found a marked preference throughout for the work considered poorer by experts. What we had intended to be distinct types of item were not, for this population, as distinct as we had expected. Uncertain about whether we could interpret school-age results obtained only with the restricted measure we had used, we prepared a much larger body of pairs (110 in number) with which to supplement it in the urban county. The two sets of slide pairs used in both counties are identified in the tables as 19BALP (i.e., the 19 pairs intended to be balanced in appeal of the two pictures to the artistically naive) and 11NEGP (i.e., the 11 pairs

negative in relation to esthetic value, in the sense that the picture poorer in the opinion of experts was expected to have greater appeal to the artistically naive.)

For guidance in selecting the additional 110 pairs from a total of 880 available, we had information about preferences of Connecticut children. Various groups of children had seen different slides in the previous research where this information had been obtained, so that a uniform item analysis could not be done with the same sample of subjects throughout. We had located for each pair the 50 secondary-school students who had scored highest and the 50 who had scored lowest on the total of 130 pairs of which the particular pair had been a part in that earlier research. We calculated the percentage of each of these two groups (identified hereafter as High Scorers and Low Scorers) who preferred the picture experts considered better in the pair. This information about each pair was the basis for selecting the additional 110 pairs and for grouping them into four additional sets, each described below.

a. A basic set of 69 pairs (identified in the tables as 69BALP) in which the esthetically better work had been preferred by more than 40% of the Low Scorers, and in which the preference of the High Scorers was at least 22 percentage points higher. We hoped that in these pairs the esthetically poorer picture would not have, for the average member of our new subject population, any strong consistent drawing power, so that preference might be fairly evenly divided between the two members of a pair. Yet with reason to doubt high correlation of individual items with total score, we felt a large number of such pairs would be desirable.

b. An additional set of 22 pairs (identified in the tables as 22NEGP) where the picture experts consider poorer has strong attraction for pupils lacking an esthetic orientation, and the better picture is strongly preferred by those with an esthetic orientation. Our criterion was that the better picture be preferred by no more than 20% of the Low Scorers and by at least 70% of the High Scorers. We made an exception in including two pairs where the High Scorers' preference was somewhat lower than 70% (64% in one instance, 62% in the other), because the subject matter was specially interesting to boys, and we were afraid too many of our pairs were decidedly feminine in appeal. These 22 pairs were so selected that they might be expected to extend the sampling represented by the 30 pairs we had used in the rural county.

c. A set of 14 pairs (identified in the tables as 14MMODP) intermediate in strength of appeal of the poorer picture. Here the percentage preferring the better picture lay between 20% and 34% for the Low Scorers, and above 80% for the High Scorers.

Table 3

Art pair preference: Internal consistency (diagonal entries) and relation among measures. (Each entry is the mean of coefficients for separate groups identified in Table 1--16 groups where only 19BALP and 11NEGP are pertinent, 8 groups in all other instances.)

	19BALP	11NEGP	69BALP	22NEGP	14MODP	5SPECP
19BALP	.37	.24	.20	.42	.28	.28
11NEGP	.24	.43	-.22	.08	-.16	.06
69BALP	.20	-.22	.57	.37	.52	.21
22NEGP	.42	.08	.37	.75	.57	.42
14MODP	.28	-.16	.52	.57	.53	.36
5SPECP	.28	.06	.21	.42	.36	.30

d. A set of 5 pairs (identified in the tables as 5SPECP, i.e., 5 special pairs) which are a small sample of very difficult items for a test of esthetic sensitivity. These are pairs where the poorer picture has strong appeal for the Low Scorers (14% or fewer of them preferring the better picture), and even the High Scorers show no very overwhelming preference for the better picture (50% to 70% of them choosing it).

The data from the urban county give us information, then, about the internal consistency and intercorrelations of six different measures of esthetic preference, each derived from a distinct set of pairs; for only two of these measures, we have comparable information from the rural county. Table 3 presents the outcome about consistency within each set of pairs and correlations among the sets. These calculations were done before the urban subjects had been separated by junior-high-school residence district; the expense of recalculation by separate district did not seem justified, since it would only lead to minute changes in averages.

The various measures all have a degree of internal consistency adequate for research with large samples, but varying greatly from one measure to another. It is not surprising that the measure based on just five pairs is the least reliable. It is also not surprising that the 69 Balanced Pairs measure is relatively unreliable for its large number of items; since the items here do not pit an esthetic appeal against a strong contrary appeal, we had expected each item to yield less information than items in the other measures (but information especially relevant to our purposes).

Study of the intercorrelations obtained from the urban data suggest that we are measuring three somewhat distinguishable variables.

(1) One variable is represented by the 11 Negatively-appealing pairs first selected for the rural study. This measure is, in the urban data, almost independent of the other measures, except for a slight tendency toward negative correlation with measures of the second variable.

(2) The second variable is best represented by the 69 Balanced pairs which had been selected for the urban study on the basis of preferences of secondary-school High and Low Scorers.

(3) The third variable is best represented by the 22 Negatively-appealing pairs selected for the urban study, again on the basis of secondary-school preferences; the 19 supposedly balanced pairs used in the rural study (found not to be balanced for this population) are closely related to this, as are the 5 difficult pairs. The 14 intermediate pairs are about equally related to the second and third variables.

The two measures available on all subjects are more closely related in the rural population than in the urban, with their intercorrelation averaging .31 instead of .16. This difference results principally from the very high relationship between the two measures for rural boys from the tenth grade up (.50 for 10th grade, .57 each for 11th and 12th), so it may have little general meaning.

A detailed item analysis and re-sorting of these items into new groupings may be desirable eventually, in case it may permit clearer formulation of results. For the present report however, it has seemed best to present results fully in relation to the measures as they were defined in advance.

V. Differences among age groups

1. Age trends in correlation between rating of a picture and recognition of its affective qualities.

Each picture was rated for liking or disliking on a 7-point scale. In a number of the pictures, the esthetic appeal seemed to us related to an ambiguity, complexity, novelty, or unpleasant emotion somehow offered by the picture yet quite capable of being missed. For each of these pictures, one or more questions we asked afforded opportunity for each subject to indicate whether he recognized this quality. For example, when Chagall's painting, The Green Violinist, was shown, one question was, "Do you feel this picture is sad?" Young children, we thought, would be more apt to dislike the picture if they were able to perceive its quality of sadness; they might like it for its bright colors, for instance, if not aware of the emotional meaning which could disturb their liking. In an artistically knowledgeable adult, on the other hand, seeing the picture as sad seems to be an important part of finding the work as a whole interesting esthetically; the picture is expressive of sadness and appreciation of its value as a work of art must depend upon recognition of that element in its meaning. If a child in secondary school has advanced toward the sort of appreciation an adult artist might have of painting, then he might appreciate this work more if able to recognize its sadness.

From the assumption that tolerance of unpleasant emotion increases with age, we felt able to predict in 23 instances that the correlation between recognition of a particular quality of a picture and liking of the picture should, with increasing age, move from a more negative correlation toward a more positive correlation (that is, should become less strongly negative or should become more strongly positive or should change from negative to positive). From the assumption that tolerance of ambiguity increases with age, we made a similar prediction for ten instances. For tolerance of complexity we made such a prediction in five instances; and for tolerance of novelty, in three. Thus, for a

total of 41 items we predicted a movement from a more negative correlation toward a more positive correlation between liking of a picture and recognition of some quality in it.

There were four opportunities to test each of these predictions--once for the comparison between the first two grades of high school and the last two grades of high school in the rural boys, one for the same comparison in the rural girls, one for the urban boys from the schools with complete data, and one for the urban girls from the schools with complete data.

The results are presented in full in tables in Appendix B. We will only summarize the results here, as they are completely negative. The change in correlation with age is in the predicted direction in 77 instances and in the opposite direction in 80 instances. In the remaining seven instances the movement is so slight that it does not show up within the limits of accuracy with which data are presented in the table; that is, the correlations to be compared are identical to two decimal points. Clearly, there is no general tendency of the sort that we predicted.

2. Age trends in understanding and responding to affective qualities of art.

The way we developed our measures of individual understanding of and response to affective qualities of art guaranteed that the measure developed would show age trends. That is, we selected for the final measures only items which did show consistent age trends. Changes in the mean of these items will not therefore establish the existence of age trends.

To deal with the question of whether age trends really exist, we must therefore go back to the question of whether the number of items we were able to select was greater than would have been expected by chance. For items about understanding affective qualities of art, as indicated earlier, we predicted a change with age on 49 items. On 13 of these items, the predicted change appeared in each of four independent groups. So uniform a confirmation would be expected by chance for only one-sixteenth of the items. Thus the 13 of 49 is to be compared with 3 out of 49, and the confirmation of prediction is very striking. Exact statistical test does not seem appropriate, because the items are not completely independent, but it seems justifiable to say that the outcome is strong confirmation of an age trend of the sort predicted.

For the items about responding to affective qualities of art, the outcome is not quite so clear. We predicted an age trend for 24 items and found it consistently confirmed in all four groups for six of these items, where by chance we would have expected it

for one and a half items. The difference here is considerable, but the items are even more interdependent than are the understanding items, several of them being based on response to a single picture.

Further confirmation of the reality of age trends is obtained by looking at the results for the 5th and 6th grade children from the rural county, whose results were not taken into account in establishing the measure. These results are entered in Appendix B, Table App.5. For the measure of understanding, the 5th and 6th grade girls clearly have a much lower mean than do any of the groups from 9th through 12th grade. The 5th and 6th grade boys have a mean slightly above that of the 9th graders but well below that of any of the higher grades. For the overall measure of response to affective qualities of art, the mean is definitely lowest in the 5th and 6th grades, although there are exceptions to regularity of age trend in some of the specific measures that make it up. The results for the 5th and 6th grades are not to be greatly emphasized, as they do not represent exactly the same population as the results for the later grades. But insofar as the children in different elementary schools within the same district represent similar populations, we have here confirmation of the age trends.

Through the years of secondary school, then, we may conclude that there is some tendency toward increase in our measures of understanding of and response to affective qualities of art. The rise is found independently in both sexes. It is found independently in both urban and rural samples of each sex.

Though our main concern here is with age trends, we should also mention that these measures are influenced by sex and social setting. In the understanding measure, girls have higher mean scores than do boys. This is true in the rural data at every separate grade level for which we have data. It is also true at each of the two grade levels for which we have urban data, and separately for each of the two school districts in the urban data. No such regular difference between the sexes appears in the measure of response to affective qualities of art; there is a suggestion of higher mean scores for girls, but the differences are very small and are not uniform.

In both measures there is also a suggestion that the urban children tend to have higher scores than the rural children. The most accurate comparison here can be made for the 12th grade, for which we have data from both counties. Each of the urban districts shows higher mean scores, separately for each sex, than those of rural children. There is a clear tendency for the same to be true if we compare the 7th grade urban children with both 9th grade and 5th and 6th grade children in the rural data; for the most part the 7th grade urban children have higher scores than

even the 9th grade rural children. All these facts are consistent with what would be expected if understanding and acceptance of affective qualities of art are dependent upon experience with art, and with other aspects of culture more likely to be associated with the urban environment than with the rural.

3. Age trends in questionnaire measure of tolerance for ambiguity, complexity, emotion, and novelty.

Our questionnaire measure of response to these affective qualities in general experience, parallel to the measures we were exploring in art, provides us with the most complete data on age trends, since on this measure we are able to include data for the 7th and 8th grades in the rural county. Throughout, we find very regular change in the direction of increased tolerance of these aspects of experience with increasing age. It appears in both rural and urban data, in each sex separately, and in each sub-category of tolerance. The details are given in Appendix B, Table App.6.

The effects are large. For example, the change from 7th to 12th grades in percentage of tolerant responses to the entire 32 items of the questionnaire is from 49% to 59% in urban boys, from 47% to 62% in rural girls, from 53% to 65% in urban boys, and from 55% to 70% in urban girls.

Could the results be due to selection of children as a result of dropping out of school or shifting to private school, rather than to a real developmental change? To some extent the general regularity of the shift from year to year argues against this, as dropping out is especially likely to occur at certain points. The number of subjects available to us in the rural area drops markedly for each sex from 8th to 9th grades, the point of graduating from junior high school and beginning senior high school. If the increased average score with increasing age were primarily due to selection, there should be a very large change in mean score at just this point. No such large change appears. The argument for selection also breaks down when we compare changes in the urban county (from the schools with complete data) and the rural county. As we have indicated earlier, the dropping out in the rural county is most likely to be from the lower end of the socioeconomic scale and hence, we believe, of pupils likely to score low rather than high on these questionnaires. In the particular urban district considered, however, loss of pupils apparently occurs most often through their shifting to a private school, and hence the effect of selection on socio-economic distribution appears likely to be the opposite of that in the rural district. The change we find in questionnaire score, however, is closely similar, both in direction and in amount, in the rural and the urban data. This fact argues strongly for the assumption that the change is primarily associated with increased age rather than

with change in distribution of socio-economic status from one grade level to another.

The change with age here cannot be an artifact of selection of items, either. The items used in the final measure were selected in a way that paid no attention to age change; it was based only on item-to-total correlations.

There are some sex differences in mean score and in age change on these questionnaire measures. The largest differences pertain to tolerance of emotion, where girls score higher than boys and their scores increase more with age.

There is also a rural-urban difference in response to these questionnaire items. Both in the 7th grade and in the 12th grade, and separately for each sex, the urban children from the schools with complete data have higher average scores on every submeasure and on the total than do the rural children.

4. Age trends in esthetic preference.

We had expected a trend toward increased score on all our esthetic preference measures. There was one exception. The 11 negatively appealing pairs originally selected for use in the rural county and then used again in the urban county showed a reverse trend very markedly for girls and to a slight extent for boys. This trend appeared in both the rural and the urban county. The effect in girls reached fairly large magnitude. In the urban school district with complete data, preference agreed with expert opinion of esthetic merit in 18% of the choices by 7th grade girls and in only 12% of choices by 12th grade girls; this drop of 6 percentage points represents almost 1/3 in absolute value.

The other measures all showed an increase in preference for the esthetically better picture with increasing age, with only a minor exception in a small reverse trend for the 5 difficult pairs in a single group of subjects, the girls from the urban district with complete data. In the rural data the rise in the other 19 pairs is not very pronounced or regular, but it does appear; the 10th, 11th and 12th grades show in each sex a fairly regular increase amounting altogether to 5 or 6 percentage points. The details of these results are given in Appendix B, Table App.6.

VI. Correlations among variables

1. Correlations between measures from response to single pictures and from questionnaire.

Both in response to single pictures and in response to the more general questionnaire items, we had measures separately of tolerance for ambiguity, complexity, emotion, and novelty. If

tolerance for each of these affective qualities in art is symptomatic or expressive of a specific tolerance for that affective quality in life generally, then we might expect a correlation between each measure from response to pictures and the corresponding measure from the questionnaire. The unsatisfactory evidence of reliable differentiation among the four specific variables on each side, already reported in section IV, renders improbable specific agreement between the two sides; yet we felt it should be measured.

The correlations between the measures of tolerance derived from the pictures and from the questionnaire are generally positive, with some exceptions. But only for one of the picture measures, that of tolerance for novelty, is there any special tendency for the correlations to be stronger with the corresponding questionnaire measure than with the other three questionnaire measures. For tolerance of novelty as measured from picture response the average correlation with the questionnaire measure of tolerance for novelty is .21, and the corresponding correlations with the questionnaire measures of tolerance for ambiguity, complexity, and emotion respectively are .18, .14, and .12. In the absence of any corresponding tendency for the other three pairs of specific variables, no confidence can be placed in the slight evidence of a specific relation for this one.

The general tendency toward positive correlation shows that the measures derived from single pictures and from the questionnaire have much in common, even though it is not specific to each of the four concepts. The total measure derived from the pictures, of tolerance for any one of the four aspects of affective qualities, and the total measure on the questionnaire, show correlations uniformly positive for all groups, varying from .07 up to .44. The average correlation over the 18 groups for which it is reported in the table in the appendix is .275. Considering that the coefficient of internal consistency for the total picture measure is only about .50 and for the questionnaire measure .58 this indicates a rather remarkable degree of agreement for measures derived from such very different materials. It does not, on the other hand, indicate that the measures are getting at a single general tendency only.

The measure of understanding of affective qualities of pictures (appearing in tables with the label UND,4CON does not have any parallel in the questionnaire. It does, however, have a positive correlation with the questionnaire measure of tolerance for ambiguity, complexity, emotion, and novelty; in only one of 16 groups is the correlation slightly negative, and the 16 coefficient average .20. The measure of understanding of affective qualities of pictures is less highly related to the picture measure of tolerance for these qualities; in 5 of the 16 groups the correlation is at least slightly negative (from -.01 to -.19), and the 16 coefficients average only .10.

2. Correlations of esthetic preference with understanding of and response to affective aspects of art, and with the personality questionnaire.

The measure of esthetic preference turned out, as we indicated earlier, to be diverse. Let us begin with the measure we are most confident of as giving an appropriate single index of esthetic preference, the measure of agreement between preferences and expert judgment on 69 pairs of slides where the esthetically poorer work has no special popular appeal. This measure was used only with the urban children. The results tend to confirm all of our expectations, and in most cases with very substantial correlations. Among the 12th grade students, this measure is correlated with the picture measure of tolerance for ambiguity, complexity, emotion, and novelty to the extent of .27 for boys and .31 for girls. With the measure of understanding of affective qualities of pictures, it has a correlation of .28 for boys and .27 for girls. All of these correlations, in view of the number of cases, are highly significant statistically. The questionnaire measure of tolerance for ambiguity, complexity, emotion and novelty has a correlation of .34 with this measure of esthetic preference for the 12th grade girls, but the correlation is only .09 for boys--the one failure of confirmation for the 12th grade.

In the 7th grade, the boys again do not show any significant correlation between the questionnaire measure and esthetic preference. For the boys, this measure of esthetic preference also shows no significant correlation with the picture measure of tolerance, whereas in the 12th grade it had a highly significant correlation for them as well as for girls. This measure of esthetic preference is not significantly correlated with the measure of understanding of affective qualities of pictures in either sex at the 7th grade level (.07 for boys and .09 for girls). But among 7th grade girls this measure of esthetic preference retains highly significant correlations with the personality measure (.27) and with the picture measure of tolerance (.38).

Thus, for the measure we can be most confident of as assessing esthetic preference, we find that our measures of understanding and tolerance of affective qualities of art are highly significantly related to it in both sexes in the 12th grade, and that a questionnaire measure of general tolerance for affective qualities of experience is also related for girls. The other variables are in general more highly related to this measure of esthetic preference in the 12th grade than in the 7th. This fact suggests that the increases from 7th to 12th grades in the means of the personality and picture measures and of esthetic preference may have some functional relationship to each other.

Let us consider next the second group of intended measures of esthetic preference, best represented by the 22 pairs with

strong popular appeal and the 14 pairs with moderate popular appeal of the esthetically poorer picture. Here we find the results are closely parallel to those obtained with the best measure. Some aspects of the results come through more clearly, and some less clearly. The measure of esthetic preference based on the 14 pairs with moderate appeal of the poorer work is highly significantly correlated with the questionnaire measure of tolerance even for 12th grade boys (.32); although its correlation with the questionnaire measure is not significant in 7th grade boys (.13), its correlations with the picture measure of tolerance are almost as high as they are for the best measure of esthetic preference, and the correlations of the understanding measure are almost as high for girls but lower for boys (where there is no significant correlation). When we consider the esthetic preference measure based on 22 pairs with strong appeal of the poorer picture, we find that the correlations in general are somewhat lower. Yet the relationship is still significant for boys of the 12th grade with both the personality measure ($r = .30$) and the picture measure of tolerance ($r = .23$); with the former, there is even a statistically significant correlation here for the 7th grade boys ($r = .23$).

For the 19 balanced pairs originally used in the rural county, we find that the results obtained in the urban county are similar in direction to those for the measures we have just considered, but the correlations with picture measures of tolerance are not statistically significant. For this measure of esthetic preference, data are also available for the rural county. In the 12th grade, the rural data confirm the positive relation between this measure and the picture measure of tolerance, with a correlation of .27 for boys and .19 for girls. In the rural county, we have parallel results for the three grades just below the 12th, and we find that any significant suggestion of a correlation disappears immediately when we go below the 12th grade. This measure of esthetic preference is also significantly correlated with the questionnaire measure for the rural data in 12th grade girls ($r = .23$) while not in girls in lower grades, but here the correlation is absent ($r = .01$) even in the 12th grade for boys. Our measure of understanding seems to have no correlation with this measure of esthetic preference in the urban data; the correlations are either close to zero or even slightly negative. In the rural data all of these correlations are to some degree negative, some significantly. There is a suggestion here of some real difference between the correlations in the rural county and in the urban county.

When we consider the third kind of intended measure of esthetic sensitivity, the one represented clearly only by the 11 pairs used in both counties whose poorer member has very strong popular appeal, we see a different outcome from that for any of the other sets of pairs. There is some significant evidence of a negative correlation, the reverse of what we had expected, in

the urban data as well as in the rural data. In the urban county, there is a significant negative correlation with the picture tolerance measure in 7th grade girls only, a correlation not significantly present in boys of the 7th grade and disappearing in both sexes in the 12th grade; in boys the correlation shifts from -.11 to .07, and in girls from -.30 to -.07. The rural data also indicate a significant negative relation to the picture tolerance measure at some grade levels but not all--the 9th grade in boys ($r = -.21$), the 10th and 11th grades in girls ($r = -.25$ and $-.22$, respectively)--with no significant indication in any instance of a positive correlation. With the measure of understanding, score on the 11 pairs is negatively correlated in all groups of girls, except for one of the 7th grade urban groups, and the coefficients average -.22; the corresponding correlations in boys are uniformly negative with an average value of -.24. The questionnaire measure of tolerance also shows a nearly uniform negative direction of correlation, significant in some groups and averaging -.17. In the urban groups permitting best comparison between 7th and 12th grades this negative correlation diminishes greatly in both sexes from 7th to 12th grades; in boys it moves from -.16 to -.07, and in girls from -.22 to .06. Like the results with the picture tolerance measure, this suggests that during the years when esthetic sensitivity is developing in some people, its significance in relation to personality changes. At the beginning of secondary school, the same personality characteristics which lead some children to appreciate an esthetic appeal when it is not pitted against a rival popular appeal, lead them also, when that appeal is pitted against a popular or more childish appeal, to be more likely than other children to make the popular choice. This union seems at the 12th grade level to show some signs of breaking down; that is, esthetic interest on the part of those children who have developed it seems to become by then more general. Personality characteristics tending to make for esthetic interest may at an earlier age support also appeals of nonesthetic sorts, but eventually they may become sufficiently strong and general so that esthetic interests take precedence over these popular appeals.

VII. Conclusions

Our study of secondary-school children from grades 7 through 12 (supplemented by some data on children in grades 5 and 6) led to the following findings:

No regular age change appears in the correlation among individuals between liking for a picture and recognition of its affective qualities.

We found evidence, valid only for some of the items used, that with increasing age affective qualities of pictures are recognized with increasing accuracy, and directly expressed tolerance of these affective qualities increases.

With increasing age, questionnaire measures of general tolerance for ambiguity, complexity, emotion, and novelty increase very markedly.

On most of the pairs of pictures presented for children's choices, we confirm previous findings that tendency to prefer the work experts consider esthetically better increases with age. On some pairs where the esthetically poorer work has especially strong popular appeal, however, an opposite change with age appears; that is, preference for the esthetically poorer work actually becomes more nearly unanimous.

Tolerance of affective qualities of pictures is, within each sex and grade group, positively correlated (average r, .19) with the questionnaire measure of general tolerance for ambiguity, complexity, emotion, and novelty. Both these measures (but especially the latter) are also correlated with recognition or understanding of affective qualities of pictures (average r, .10 and .20 respectively).

Measures of preference for art considered esthetically better by experts are, in the 12th grade, positively related to all of the other measures: understanding of affective qualities of pictures, tolerance of affective qualities of pictures, and general tolerance of affective qualities. In lower grades, these relations are not dependable, but occur in some groups. Certain pairs of pictures, where the esthetically poorer work has especially strong popular appeal, even show an opposite relation to these other measures in the earlier years of secondary school.

In general, the measures used in this study do not, in their present form, have sufficiently high internal consistency to warrant their practical use in evaluation of individual performance. They are in their present form useful only for research on group differences and on relations among variables.

VIII. Recommendations

This research indicates the feasibility of studying the understanding of and response to affective qualities of art, and yields some items that can be useful in that study. The low internal consistency of the measures, and the fact that many intended items either were unrelated to other items or failed to show expected age changes, warrant skepticism about the ease of developing tests for reliable measurement of individual status on these variables. Pursuit of research seems feasible, and is recommended, to uncover how these variables are related to each other and to additional pertinent variables, how they develop with age, and how they might be influenced by special educational measures.

Appendix A

New Instruments Used

The actual instruments used are reproduced here, slightly reduced to fit the present page size. They have been made more informative, however, by adding certain material to each instrument before reproduction, as will now be indicated.

Instrument to assess understanding and responding to affective qualities of art. This instrument consisted of 26 projected slides, and a question-and-answer form distributed to the subjects. The question-and-answer form is reproduced here. In the form distributed to the subjects, the successive slides were identified only as Picture A, Picture B, etc. Before reproduction for this appendix, the artist and title were inserted after this identification; where the work was not a painting or drawing, its nature was also indicated. In the form distributed to the subjects, the questions were separately numbered for each picture. In the text of this report, however, they are referred to by a single consecutive numbering, and this numbering was inserted before reproduction, just after (or, in some instances, above or below) each question mark.

Questionnaire to assess general tolerance of ambiguity, complexity, emotion, and novelty. Before this questionnaire was reproduced, a key to its scoring was inserted. The key to direction of scoring is given by the underlining of Yes or No, to indicate which response was scored positively for tolerance. The key to the grouping of the 32 items into four sets of eight items each is given by insertion of a letter before Yes No, to indicate whether the item was scored for tolerance of ambiguity (A), complexity (C), emotion (E), or novelty (N).

Picture A (Gainsborough, Mrs. Bolton)

A 1. How much do you like or dislike Picture A? 1

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

A 2. Do you think the woman is

angry? yes 2 no happy? yes 3 no sad? yes 4 no thoughtful? yes 5 no

A 3. Do you think she would be an interesting person to know? yes 6 no

Picture B (Peters, Lady Elisabeth)

B 1. How much do you like or dislike Picture B? 7

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

B 2. Do you think the woman is

angry? yes 8 no happy? yes 9 no sad? yes 10 no thoughtful? yes 11 no

B 3. Do you think she would be an interesting person to know? yes 12 no

Picture C (Turner, Rain, steam, speed)

C 1. Picture C is supposed to show a train coming toward us through the rain.

How much do you like or dislike the way that the subject is presented? 13

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

C 2. Do you think this way of presenting the subject is

amusing?	yes 14 no	boring?	yes 15 no	clever?	yes 16 no	exciting?	yes 17 no	irritating?	yes 18 no	stupid?	yes 19 no

Picture D (Borsig photograph, **Nest of osprey**)

D 1. How much do you like or dislike Picture D? 20

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

D 2. Which of these titles would come closest to expressing the general feeling this picture gives you? 21

1. A Cozy Home in the Heavens
2. In Company There Is Strength
3. The Ups and Downs of Life

Picture E (Hundertwasser, **Yellow smoke**)

E 1. How much do you like or dislike Picture E? 22

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

E 2. Does this house seem to be frightening? yes 23 no happy? yes 24 no mysterious? yes 25 no

ordinary? yes 26 no romantic? yes 27 no sad? yes 28 no

Picture F (**Mondrian, Composition**)

F 1. How much do you like or dislike Picture F? 29

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

F 2. The parts of it are very much alike in size and shape, and don't differ much in color; does the fact the parts are so much alike

make you like this picture 30 more? / less?

Picture G (Munch, Anxiety)

G 1. How much do you like or dislike Picture G? 31

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

G 2. Do you think this picture is

happy? 32 yes / no — interesting? 33 yes / no — puzzling? 34 yes / no — strange, or weird? 35 yes / no

G 3. Does this picture tend to make you feel relaxed? 36 yes / no — anxious or fearful? 37 yes / no

Picture H (Tchelitchew, Natalie Paley as Ophelia)

H 1. How much do you like or dislike Picture H? 38

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

H 2. Do you think the woman shown here is happy? 39 yes / no — sad? 40 yes / no

Picture I (Gris, Guitar and flowers)

I 1. This picture is called "Guitar and Flowers". How much do you like the way the subject is presented? 41

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

I 2. Do you find this way of presenting the subject

amusing? 42 yes / no boring? 43 yes / no clever? 44 yes / no exciting? 45 yes / no interesting? 46 yes / no

irritating? 47 yes / no stupid? 48 yes / no

Picture J (Kandinsky, Compositie)

J 1. How much do you like or dislike Picture J? 49

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

J 2. Do you think it is amusing? 50 yes / no angry? 51 yes / no happy? 52 yes / no sad? 53 yes / no

Picture K (Lange photograph, Bad trouble over the weekend)

K 1. How much do you like or dislike this photograph? 54

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

K 2. If you were asked to write a story about this photograph, what would come to mind? 55

1. one story
2. several stories

K 3. If you thought of several stories about this photograph, do you expect they would be 56

1. very much alike
2. very different, one from another

K 4. Think of the one story this picture most strongly suggests to you. Would it be

happy? 57 yes / no long and complicated? 58 yes / no sad? 59 yes / no short and simple? 60 yes / no

Picture L (Schiele, Little Austrian girl)

L 1. How much do you like or dislike Picture L? 61

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

L 2. Do you think the little girl is

happy? 62 yes / no

interesting? 63 yes / no

sad? 64 yes / no

thoughtful? 65 yes / no

Picture M (Barlach sculpture, Man singing)

M 1. This statue is called, "Man Singing". How much do you like or dislike the way the subject is presented? 66

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

M 2. Do you think the man shown here is

angry? 67 yes / no

happy? 68 yes / no

sad? 69 yes / no

thoughtful? 70 yes / no

Picture N (Miro, Catalan landscape)

N 1. How much do you like or dislike Picture N? 71

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

N 2. Does the picture seem to you to be

amusing? 72 yes / no

happy? 73 yes / no

puzzling? 74 yes / no

sad? 75 yes / no

scary? 76 yes / no

Picture O (Adams photograph, Thundercloud, Lake Tahoe)

O 1. How much do you like or dislike Picture O? 77

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

O 2. Which of these titles would come closest to expressing the general feeling this picture gives you? 78

1. Peace to All
2. Anger and Revenge
3. Happy Days Are Here Again

Picture P (Tchelitchew, Tree into hand into foot)

P 1. Notice that you can see this picture three different ways: as a hand, as a foot, as a tree. How much do you like or dislike this picture? 79

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

P 2. How do you feel about the fact that the picture can be seen several different ways?

Does it make you like the picture more? / less? 80

P 3. Does this kind of picture, that can be seen several different ways, seem to you

amusing? yes 81 / no — annoying? yes 82 / no — interesting? yes 83 / no — strange or weird? yes 84 / no

Picture Q (Marin, Phippsburg, Maine)

Q 1. How much do you like or dislike this picture? 85

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

Q 2. Do you think this way of presenting a landscape is

amusing? yes 86 / no — boring? yes 87 / no — clever? yes 88 / no — exciting? yes 89 / no — irritating? yes 90 / no — stupid? yes 91 / no

Q 3. Would you like the painting better if the artist had trimmed the edges in the usual way to make it straight on all four edges? yes / no 92

Picture R (Kojima sculpture, Figure with stripes)

R 1. How much do you like or dislike this sculpture? 93

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

R 2. Does it make you feel

amused? yes 94 no happy? yes 95 no relaxed? yes 96 no uncomfortable? yes 97 no

R 3. What feelings do you think the artist was trying to express?

amusement? yes 98 no anger? yes 99 no sadness? yes 100 no thoughtfulness? yes 101 no

Picture S (Suzuki, untitled abstract painting)

S 1. How much do you like or dislike Picture S? 102

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

S 2. Do you think it is amusing? yes 103 no angry? yes 104 no happy? yes 105 no sad? yes 106 no

scary? yes 107 no tender? yes 108 no

Picture T (Kandinsky, Several circles)

T 1. How much do you like or dislike Picture T? 109

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

T 2. The things in it are mostly of one shape; does this fact make you like the picture more? / less? 110

Picture U (Chagall, The green violinist)

U 1. How much do you like or dislike Picture U? 111

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

U 2. Does the green face make you like the picture more? less? 112

U 3. Do you find the green face

amusing? yes 113 no
happy? yes 114 no
irritating? yes 115 no
sad? yes 116 no

Picture V (Klee, Mask of fear)

V 1. How much do you like or dislike Picture V? 117

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

V 2. Does the picture seem to you to be amusing? yes 118 no
happy? yes 119 no
puzzling? yes 120 no

sad? yes 121 no
scary? yes 122 no

Picture W (Bauer, Red triangle)

W 1. How much do you like or dislike Picture W? 123

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

W 2. The things in it have a great variety of shapes; does this fact make you like the picture more? less? 124

Picture X (Barlach sculpture, Horror)

X 1. How much do you like or dislike this statue? 125

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

X 2. Do you think the person shown here is

angry? 126 yes / no happy? 127 yes / no sad? 128 yes / no thoughtful? 129 yes / no

Picture Y (Adams photograph, Thundercloud)

Y 1. How much do you like or dislike Picture Y? 130

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

Y 2. Which of these titles would come closest to expressing the general feeling this picture gives you? 131

1. The Roar of the Lion
2. The Sleeping Beauty
3. Laughing and Tumbling

Picture Z (Kesting photograph of man, ship, boy, and boat)

Z 1. Here a photographer printed several scenes on top of one another to make the single picture you see. How well do you like or dislike Picture Z? 132

1	2	3	4	5	6	7
Dislike very much	Dislike moderately	Dislike a little	Indifferent	Like a little	Like moderately	Like very much

Z 2. Do you find this mixture of several scenes

amusing? 133 yes / no boring? 134 yes / no exciting? 135 yes / no irritating? 136 yes / no puzzling? 137 yes / no

Here are a number of statements people might make about themselves, their opinions, and their ways of looking at the world. If a statement is true of you, or expresses an opinion you agree with, circle Yes. Otherwise, circle No. Read a statement carefully enough to understand it, then mark Yes or No and go on to the next statement. Don't spend a long time thinking about whether to mark Yes or No; give your first impression as soon as you are sure you understand the statement.

1.	When I see a movie or read a story, I want the ending to be very clear; I don't like to be left uncertain about what the ending means.	A	Yes	No
2.	The best way to live is to forget all about troubles and feelings, and just take things in a matter-of-fact way as they come.	E	Yes	No
3.	Unusual ideas, even if not practical, are often fun to pursue.	N	Yes	No
4.	At the end of a textbook chapter, a set of thought-provoking questions is more interesting to me than a good clear-cut summary would be.	A	Yes	No
5.	I enjoy arguments about problems that don't have any one right answer.	C	Yes	No
6.	I seldom become thrilled over new ideas or experiences the way some people do; rather, I tend to take these things as they come.	N	Yes	No
7.	The man who truly loves a woman must regard her as the best in the world in every important way.	C	Yes	No
8.	I prefer books and movies that excite intense emotions, even if the emotions are fear and sorrow as well as love and joy.	E	Yes	No
9.	The type of humor which is based upon the fantastic, strange, or impossible has little appeal for me.	N	Yes	No
10.	To eat something I don't recognize makes me feel uncomfortable in the stomach.	A	Yes	No
11.	As a help in studying a play or novel, questions which make you think about it would be more valuable than a summary which would make it easier to follow.	C	Yes	No
12.	Most of the country's problems would be solved if we could somehow get rid of the criminals, sinners, and insane people.	C	Yes	No
13.	I wish a new vegetable or fruit could be introduced every year; it would be more interesting than having the same ones all the time.	N	Yes	No
14.	Walking to a specific place would be more enjoyable to me than wandering aimlessly, just looking around and thinking.	A	Yes	No

15.	I see little reason to try out new routes to a place I go often, when the old route gets me there just as well.	N	Yes	No
16.	I like picturing to myself all kinds of things that happen to people--even sad and unpleasant things.	E	Yes	No
17.	Unquestioning loyalty is the first requirement of good citizenship.	C	Yes	No
18.	While listening to a friend tell about an experience, I find it hard to really feel what he must have felt.	E	Yes	No
19.	Life is most enjoyable at those times when it is filled with uncertainty about what is coming next.	A	Yes	No
20.	A church should always look like a church; a house should always look like a house; a store like a store, and so on.	A	Yes	No
21.	Even if the study of different ideas makes you doubt your own ideas, I think it should be encouraged.	C	Yes	No
22.	I would rather have a very close friendship with a few people than a more casual friendship with a great many.	E	Yes	No
23.	Something I read is more enjoyable if I find different meaning in it every time I read it, than if it means the same to me every time.	A	Yes	No
24.	A person should not probe too deeply into his own and other people's feelings, but should take things as they are.	E	Yes	No
25.	Unusual but unimportant sides of a situation or object often interest me, taking up my attention and imagination for a time.	N	Yes	No
26.	We may confidently expect that mankind will some day improve to a point where crime and sin will have disappeared.	C	Yes	No
27.	I have seen some things so sad that I almost felt like crying.	E	Yes	No
28.	I tend to distrust newspaper headlines.	C	Yes	No
29.	I think the tried and true ways of doing things are the best ways.	N	Yes	No
30.	There is little reason to imagine what it would be like to be blind or crippled; it is better not to think about these things unless forced to.	E	Yes	No
31.	I like to try out new ways of doing things, even if the old ways are perfectly satisfactory.	N	Yes	N
32.	I enjoy seeing optical illusions and other pictures that make you wonder what is real and what isn't.	A	Yes	No

Appendix B

Tables Presenting Detailed Results

Detailed results are presented here in a series of tables for reference use. For the most part, each table is self-explanatory. The tables are listed below with explanatory notes that may be useful and in some instances necessary. To distinguish these tables from those in the main text of the report, they are labeled Table App. 1, Table App. 2, etc.

Table App. 1: Correlations between ratings of a picture and judgment that a given feature is present or absent: Correlations relevant to tolerance of ambiguity
Table App. 2: ----------: Correlations relevant to tolerance of complexity
Table App. 3: ----------: Correlations relevant to tolerance of emotion
Table App. 4: ----------: Correlations relevant to tolerance of novelty

These tables (App. 1, App. 2, App. 3, and App. 4) present in detail the negative results summarized on pages 25 and 26 of the text, entitled "Age trends in correlation between rating of a picture and recognition of its affective qualities."

Table App. 5: Picture measures: Means
Table App. 6: Personality questionnaire and art pairs preference: Means

These tables (App. 5 and App. 6) present the details of mean scores of all groups on all measures; the main substance of these results is given on pages 26 to 29 of this report. The labels used for the variables are explained in the text and also below, in the listing of tables App. 7 through App. 26.

The following tables (App. 7 through App. 26) present the details of correlation among measures, for separate groups of subjects (because of the limited use made of data from the 5th and 6th grades, only some of the results have been calculated for them). These tables are arranged in the same order in which the variables appear within each table, and in general each correlation will appear twice, once in the table for each of the two variables concerned. There is one exception: The variable PICTOT, which occupies one line in each table, is the sum of all eight separate measures of understanding and tolerance derived from response to

pictures; after most of the tables had been prepared, we decided a more useful measure would be the sum of only the four tolerance measures (PICTOLTOT), and have prepared a table showing its relations to all other measures and inserted it in this sequence where the table for PICTOT would have been. We recommend that the correlations for PICTOT be disregarded; the correlations for PICTOLTOT appear only in their own table and should be consulted there. For convenient reference, the title of the correlational table for each variable is preceded below by the abbreviation used to identify that variable in all tables.

Table App. 7: PERTOT: Total questionnaire measure
Table App. 8: TOLAMB: Questionnaire measure of tolerance for ambiguity
Table App. 9: TOLCOM: Questionnaire measure of tolerance for complexity
Table App. 10: TOLEMO: Questionnaire measure of tolerance for emotion
Table App. 11: TOLNOV: Questionnaire measure of tolerance for novelty
Table App. 12: PICTOLTOT: Total picture tolerance measure
Table App. 13: PICAMB: Picture measure of tolerance for ambituity
Table App. 14: PICCOM: Picture measure of tolerance for complexity
Table App. 15: PICEMO: Picture measure of tolerance for emotion
Table App. 16: PICNOV: Picture measure of tolerance for novelty
Table App. 17: UND,4CON: Picture measure of understanding, items with uniform predicted age change
Table App. 18: UND,3CON: Picture measure of understanding, items with almost uniform predicted age change
Table App. 19: UND,EMP: Picture measure of understanding, empirically derived items
Table App. 20: UND,REV: Picture measure of understanding, items with uniform age change the reverse of prediction
Table App. 21: 19BALP: Picture pair measure, nineteen balanced pairs used in rural county
Table App. 22: 11NEGP: Picture pair measure, eleven negative-draw pairs used in rural county
Table App. 23: 69BALP: Picture pair measure, sixty-nine balanced pairs selected for urban county
Table App. 24: 22NEGP: Picture pair measure, twenty-two negative-draw pairs selected for urban county
Table App. 25: 14MODP: Picture pair measure, fourteen moderate negative-draw pairs selected for urban county
Table App. 26: 5SPECP: Picture pair measure, five special pairs selected for urban county

Finally, there is one table giving the details of internal consistency for the several picture pair measures, findings which have been presented only in summary form in the text of the report and in the diagonal of Table 3.

Table App. 27: Art pair preference: Internal consistency as measured by the alpha coefficient

51

Table App. 1

Correlations between ratings of a picture and judgment that a given feature is present or absent.
Correlations relevant to tolerance of ambiguity

(The two items entering into a correlation are identified by their consecutive numbers in the questionnaire appearing in Appendix A. Positive correlations are indicative of tolerance of ambiguity. Decimal points are omitted.)

Variable	Rural data: Boys in grade 5&6	9	10	11	12	Rural data: Girls in grade 5&6	9	10	11	12	Urban data: Boys, Schools with complete data 7	12	Boys, Other schools 7	12	Girls, Schools with complete data 7	12	Girls, Other schools 7	12
Number of persons	151	107	110	63	73	144	101	110	125	116	189	107	137	34	157	125	125	39
1,5 Gainsborough thoughtful	-00	53	17	31	31	-02	27	18	-03	-04	28	-00	26	-11	21	19	-19	14
7,11 Peters thoughtful	15	22	16	33	04	25	08	09	34	28	11	19	-03	11	07	12	-06	05
13,18 Turner irritating	-31	-35	-31	-32	-46	-09	-40	-47	-43	-53	-41	-34	-40	-31	-41	-53	-34	-31
22,25 Hundert-wasser mystr.	-11	-06	07	-02	09	-15	-06	-02	00	22	44	01	-21	00	-04	-09	-08	-16
31,34 Munch puzzling	-10	02	-09	-26	-10	-23	-31	-02	06	03	01	-07	-13	-15	05	-04	09	-12
41,47 Gris irritating	-13	-46	-43	-64	-60	-21	-41	-43	-57	-58	-32	-48	-43	-07	-53	-61	-45	-53
71,74 Miro puzzling	02	12	-14	30	-07	20	05	08	06	00	-07	-20	-20	-19	-13	05	-20	-18
85,90 Marin irritating	02	15	-16	10	-19	-12	05	-11	-07	13	-35	-36	-48	-61	-48	-52	-33	-17
117,120 Klee puzzling	-15	-07	-20	-06	-16	-03	-31	-25	-02	-05	-21	-17	-02	-17	-24	01	-20	-17
132,137 Keating puzzling	-27	-28	00	-20	-33	-17	-10	-01	-24	-23	14	00	-05	-17	12	-07	-20	-14

Table App. 2

Correlations between ratings of a picture and judgment that a given feature is present or absent
Correlations relevant to tolerance of complexity

(The two items entering into a correlation are identified by their consecutive numbers in the questionnaire appearing in Appendix A. Positive correlations are indicative of tolerance of complexity. Decimal points are omitted.)

Variable	Rural data: Boys in grade 5&6	9	10	11	12	Rural data: Girls in grade 5&6	9	10	11	12	Urban data: Boys, Schools with complete data 7	12	Boys, Other schools 7	12	Girls, Schools with complete data 7	12	Girls, Other schools 7	12
Number of persons	151	107	110	63	73	144	101	110	125	116	189	107	137	34	157	125	125	39
54,55 Lange several stories	04	-10	-03	19	-17	40	-13	01	-17	-10	15	-01	02	15	08	07	-03	-02
54,56 Lange stories differ	-08	-13	-14	-01	11	-04	-07	02	-22	-16	08	16	06	03	03	05	-05	-14
54,58 Lange long & comp.	-01	29	24	-03	-12	06	-14	10	-11	08	-01	-02	06	05	02	22	07	01
111,115 Chagall irritating	-27	-35	-13	-33	-12	-19	-39	-30	-34	-35	-26	-38	-37	-41	-39	-28	-20	-42
132-136 Keating irritating	-34	-32	-50	-61	-65	-24	-42	-62	-67	-53	-36	-61	-47	-45	-46	-60	-49	-71

Table App. 2

Correlations between ratings of a picture and judgment that a given feature is present or absent
Correlations relevant to tolerance of emotion

(The two items entering into a correlation are identified by their consecutive numbers in the questionnaire appearing in Appendix A. Positive correlations are indicative of tolerance of emotion. Decimal points are omitted.)

Variable	Rural data: Boys in grade 5&6	9	10	11	12	Rural data: Girls in grade 5&6	9	10	11	12
Number of persons	151	107	110	63	73	144	101	110	125	116
1,4 Gainsborough sad	-08	-26	-21	-24	-23	-17	-12	-07	-05	07
20,21 Ups and Downs of Life	-07	-14	-10	-02	-29	-19	-25	-40	-02	-24
22,23 Hundert. frightening	-08	13	-15	18	10	-12	-33	05	08	-03
22,28 Hundertwasser sad	-13	-19	-18	-04	-26	-17	-22	04	05	-11
31,37 Munch anxious	08	03	08	-06	06	-02	-16	-02	-03	-08
38,40 Tchelitchew sad	03	-13	-12	-38	-20	-02	01	20	14	01
54,59 Lange sad	-05	-01	08	18	-15	02	04	08	07	01
61,64 Schiele sad	-00	-18	18	04	01	11	08	-11	-06	06
71-75 Miro sad	-08	-02	-03	-03	09	-09	15	06	03	-02
71,76 Miro scary	-01	-08	01	-29	05	12	01	-02	10	14
77,78 Anger-Revenge	04	-12	13	03	-05	-04	17	07	03	-07

Variable	Urban data: Boys, Schools with complete data 7	12	Boys, Other schools 7	12	Girls, Schools with complete data 7	12	Girls, Other schools 7	12
Number of persons	189	107	137	34	157	125	125	39
1,4 Gainsborough sad	-10	-01	-11	15	-16	-18	-03	-28
20,21 Ups and Downs of Life	-08	-20	-22	-31	-25	-13	-09	-11
22,23 Hundert. frightening	10	-02	11	-08	-14	-25	14	20
22,28 Hundertwasser sad	-25	-10-	-08	-11	-04	-20	-11	-01
31,37 Munch anxious	-07	-07	21	09	-02	-01	-15	22
38,40 Tchelitchew sad	-06	-19	-14	-06	10	07	-03	-24
54,59 Lange sad	-12	-13	-31	-32	03	-15	-21	15
61,64 Schiele sad	-16	-19	-18	-30	-00	08	-01	31
71-75 Miro sad	-01	06	-17	-24	-15	06	-08	-17
71,76 Miro scary	-04	07	11	19	-01	03	17	-04
77,78 Anger-Revenge	-20	-03	-29	-08	-21	-30	-17	-45

Table App. 3, first of two pages

(Table App. 3, second of two pages)

Correlations between ratings of a picture and judgment that a given feature is present or absent
Correlations relevant to tolerance of emotion

(The two items entering into a correlation are identified by their consecutive numbers in the questionnaire appearing in Appendix A. Positive correlations are indicative of tolerance of emotion. Decimal points are omitted.)

Variable	Rural data: Boys in grade 5&6	9	10	11	12	Rural data: Girls in grade 5&6	9	10	11	12	Urban data: Boys, Schools with complete data: 7	12	Boys, Other schools: 7	12	Girls, Schools with complete data: 7	12	Girls, Other schools: 7	12
Number of persons	151	107	110	63	73	144	101	110	125	116	189	107	137	34	157	125	125	39
93,97 Kojimo uncomfortable	-02	-01	-03	-05	-07	-08	-06	-11	-09	23	-34	-19	-20	-30	-24	-20	-40	-49
93,99 Kojimo anger	-03	05	02	-02	04	-07	02	04	-14	14	-05	-07	-07	07	-04	-27	-23	-26
93,100 Kojimo sadness	-03	07	-21	03	13	-00	04	07	-01	-07	-11	-15	-24	-26	-20	13	-07	12
102,104 Suzuki angry	-19	02	-09	-15	-09	-07	-20	-03	-07	-06	-10	04	-16	06	-25	-09	-21	13
102,106 Suzuki sad	-02	-08	-25	-08	-09	-01	-08	-07	03	03	-05	-13	-18	19	-04	08	-01	30
102,107 Suzuki scary	-01	05	-16	04	-05	07	-28	01	-20	-07	10	13	-10	10	-07	15	-04	-07
111,116 Chagall sad	-17	08	-08	-05	-12	-00	-07	-14	-13	08	-04	06	-20	-13	08	11	07	01
117,121 Klee sad	-12	-40	-06	-02	08	-25	-30	17	-09	21	-06	-22	-09	00	-25	-07	02	14
117,122 Klee scary	-06	-12	08	27	02	-06	-27	-10	-05	-23	04	00	07	05	-01	-02	-01	-30
125,126 Barlach angry	-23	-12	-16	-36	-10	-03	-35	-27	01	-19	-10	12	-05	-19	-05	-20	-05	-02
125,128 Barlach sad	-26	-11	-21	-22	-19	05	-21	-23	04	-04	-13	-13	-01	00	-13	01	-15	-08
130,131 Roar of the Lion	-28	08	-10	-07	-13	-23	-16	-04	-06	04	07	-14	-19	01	-14	-21	-05	-32

Table App. 4

Correlations between ratings of a picture and judgment that a given feature is present or absent
Correlations relevant to tolerance of novelty

(The two items entering into a correlation are identified by their consecutive numbers in the questionnaire appearing in Appendix A. Positive correlations are indicative of tolerance of novelty. Decimal points are omitted.)

	Rural data										Urban data							
											Boys				Girls			
											Schools with complete data		Other schools		Schools with complete data		Other schools	
Variable	Boys in grade					Girls in grade												
	5&6	9	10	11	12	5&6	9	10	11	12	7	12	7	12	7	12	7	12
Number of persons	151	107	110	63	73	144	101	110	125	116	189	107	137	34	157	125	125	39
22,26 Hundert-w. not ordinary	-03	01	06	-28	-08	-12	-26	-23	01	10	-07	-07	-14	24	-02	-02	-09	-30
31,35 Munch strange	-11	01	-15	01	-00	-15	-19	-23	-07	-18	-13	04	-19	05	-18	-12	-06	-07
79,84 Tchelitchew strange	-08	-15	06	-05	02	-00	-09	05	-08	-10	-08	-05	-14	17	-11	01	-20	-24

Table App. 5

Picture measures: means

Variable	Rural data: Boys in grade 5&6	9	10	11	12	Rural data: Girls in grade 5&6	9	10	11	12	Urban data: Boys, Schools with complete data 7	12	Boys, Other schools 7	12	Girls, Schools with complete data 7	12	Girls, Other schools 7	12
N	151	107	110	63	73	144	101	110	125	126	189	107	137	34	157	125	125	39
PICTOT	25	27	27	29	30	25	28	28	30	31	28	33	27	32	29	34	29	33
PICAMB x 100	50	75	80	89	88	49	77	80	80	96	73	107	84	100	93	110	103	97
PICCOM x 10	28	27	28	28	34	30	27	29	32	34	32	37	32	34	30	36	32	34
PICEMO x 100	74	82	66	87	71	81	81	58	74	78	78	90	89	88	55	93	59	103
PICNOV x 10	25	29	28	30	33	25	27	29	32	34	32	37	29	37	32	38	30	36
UND,4CON x 10	83	82	88	96	94	89	94	99	100	102	89	99	86	98	93	111	95	103
UND,3CON x 10	40	48	46	46	47	39	47	47	50	50	44	50	44	52	48	50	46	52
UND,EMP x 10	45	48	50	52	55	43	48	49	55	54	49	62	50	50	52	63	50	58
UND,REV x 10	15	17	19	20	20	14	17	17	17	19	17	22	16	23	18	22	16	21
PICTOLTOT x 10	66	72	70	76	82	68	70	71	79	85	79	94	77	91	78	95	78	91

Table App. 6
Personality questionnaire and art pair preference: means (percent scores x 10)

Variable	Rural data																Urban data							
	Boys in grade								Girls in grade								Schools with complete data		Other schools		Schools with complete data		Other schools	
	5	6	7	8	9	10	11	12	5	6	7	8	9	10	11	12	7	12	7	12	7	12	7	12
N	48	42	141	142	99	124	63	73	38	49	155	144	97	110	125	112	189	107	137	34	157	125	125	39
PERTOT			486	486	495	501	558	594			472	513	537	549	582	618	534	653	516	599	553	699	488	628
TOLAMB			464	450	436	452	458	515			449	458	459	481	452	529	490	574	463	544	464	557	431	484
TOLCOM			450	432	439	463	562	596			373	461	473	484	515	569	468	613	463	551	459	646	394	606
TOLEMO			526	518	509	531	566	608			531	537	611	606	643	702	564	723	539	643	618	829	534	750
TOLNOV			504	542	597	560	645	658			536	595	604	625	719	671	618	703	599	658	673	762	592	673
19BALP	296	257			265	261	276	319	247	262			262	199	224	257	274	313	294	302	291	328	247	313
11NEGP	291	271			189	204	209	183	313	265			160	181	124	118	216	211	228	195	183	125	185	179
69BALP																	508	573	495	582	523	634	512	586
22NEGP																	211	326	235	329	225	354	188	346
14MODP																	372	491	337	519	407	577	327	487
5SPECP																	244	280	238	336	266	253	205	276

Table App. 7

Total questionnaire measure

Correlation with other measures

Variable	Rural data: Boys in grade 9	10	11	12	Rural data: Girls in grade 9	10	11	12	Urban data: Boys, Schools with complete data 7	12	Boys, Other schools 7	12	Urban data: Girls, Schools with complete data 7	12	Girls, Other schools 7	12
N	107	110	63	73	101	110	125	116	189	107	137	34	157	125	125	39
PERTOT																
TOLAMB	67	61	65	72	68	64	62	75	65	78	62	74	67	80	67	73
TOLCOM	59	54	51	63	61	57	60	77	60	68	69	50	60	76	64	41
TOLEMO	71	65	62	77	64	64	64	73	74	60	67	58	65	59	71	76
TOLNOV	67	65	72	71	71	81	63	74	66	71	65	75	66	73	61	74
PICTOT	34	33	51	11	36	46	40	38	41	15	23	33	41	34	21	36
PICAMB	21	02	03	-11	29	-02	14	05	05	-01	18	-19	14	01	-14	-03
PICCOM	24	21	19	04	34	32	06	18	08	29	11	21	39	10	10	34
PICEMO	-08	16	11	11	39	11	34	13	20	28	08	21	03	12	15	50
PICNOV	18	28	28	12	18	38	33	32	31	14	29	16	31	10	28	31
UND,4CON	14	19	51	17	-05	26	27	15	29	15	05	46	20	34	10	21
UND,3CON	-06	09	21	-04	13	22	14	-05	15	-09	-02	37	17	12	-08	-19
UND,EMP	-26	11	35	-08	17	28	08	14	25	-09	12	-20	14	18	04	-08
UND,REV	01	-13	05	07	16	14	12	24	-10	-08	-06	-15	05	07	12	23
19BALP	-06	00	-08	01	09	-16	-03	23	04	25	02	06	07	18	-08	13
11NEGP	-18	-05	-24	-19	-15	-19	-22	-30	-16	-07	-20	-46	-22	06	-11	01
69BALP									10	09	18	29	27	34	17	34
22NEGP									23	30	12	17	10	36	-00	41
14MODP									13	32	15	43	24	30	16	06
5SPECP									05	26	07	04	11	16	09	24

Table App. 8

Questionnaire measure of tolerance for ambiguity

Correlation with other measures

Variable	Rural data: Boys in grade 9	10	11	12	Rural data: Girls in grade 9	10	11	12	Urban data: Boys, Schools with complete data 7	12	Boys, Other schools 7	12	Urban data: Girls, Schools with complete data 7	12	Girls, Other schools 7	12
N	107	110	63	73	101	110	125	116	189	107	137	34	157	125	125	39
PERTOT	67	61	65	72	68	64	62	75	65	78	62	74	67	80	67	73
TOLAMB																
TOLCOM	25	04	12	25	27	19	19	46	26	41	24	30	18	48	22	10
TOLEMO	34	24	14	46	20	18	20	44	32	26	27	20	22	30	27	32
TOLNOV	17	19	39	31	30	33	16	33	22	44	16	47	29	44	31	45
PICTOT	06	10	43	15	24	16	13	27	26	-00	14	18	28	23	12	24
PICAMB	06	-27	19	-18	23	-11	02	22	-01	-02	10	-15	08	01	-09	03
PICCOM	07	11	17	05	28	26	-01	13	00	06	11	24	32	07	14	45
PICEMO	15	15	-02	01	32	16	10	10	19	28	14	06	-02	14	24	26
PICNOV	01	25	25	20	16	12	10	27	29	18	31	05	23	08	16	30
UND,4CON	-06	04	39	22	-09	11	14	01	08	03	07	41	06	16	10	07
UND,3CON	-01	-11	13	04	12	-06	-02	-17	12	-08	-06	16	17	02	-20	-29
UND,EMP	01	12	32	-08	06	02	-01	19	18	-20	-12	-21	07	15	01	-05
UND,REV	-13	-18	05	05	09	11	11	18	-01	-12	-05	-21	12	18	-07	14
19BALP	13	14	-05	10	17	-03	12	17	02	18	02	11	12	15	02	10
11NEGP	-07	16	-16	-09	-11	-03	-15	-27	-12	09	-16	-38	-14	11	-06	18
69BALP									-02	-04	14	42	26	26	29	07
22NEGP									16	29	20	22	10	32	11	30
14MODP									-06	24	22	38	17	21	20	01
5SPECP									01	19	06	03	06	12	10	21

Table App. 9

Questionnaire measure of tolerance for complexity

Correlation with other measures

Variable	Rural data: Boys in grade 9	10	11	12	Rural data: Girls in grade 9	10	11	12	Urban data: Boys: Schools with complete data 7	12	Boys: Other schools 7	12	Urban data: Girls: Schools with complete data 7	12	Girls: Other schools 7	12
N	107	110	63	73	101	110	125	116	189	107	137	34	157	125	125	39
PERTOT	59	54	51	63	61	57	60	77	60	68	69	50	60	76	64	41
TOLAMB	25	04	12	25	27	19	19	46	26	41	24	30	18	48	22	10
TOLCOM																
TOLEMO	15	13	11	29	15	06	15	38	22	26	23	06	19	25	33	13
TOLNOV	20	17	07	33	16	32	15	42	10	25	31	08	15	42	10	-01
PICTOT	-26	23	12	18	15	37	22	35	16	22	07	-03	20	31	15	28
PICAMB	20	22	-10	13	16	06	13	07	07	06	05	-15	12	07	-18	20
PICCOM	24	08	05	-00	07	08	-03	20	-06	18	-07	-27	20	-01	10	33
PICEMO	-06	15	31	08	40	10	19	18	10	22	06	03	-03	07	13	20
PICNOV	07	09	05	-02	01	40	19	34	10	17	10	08	15	16	17	18
UND,4CON	05	08	08	21	-09	17	16	09	18	17	-06	11	10	32	05	05
UND,3CON	05	19	03	-03	18	30	13	-05	-00	-09	-03	21	02	09	-11	-02
UND,EMP	26	02	06	05	05	23	02	12	14	01	18	-21	06	21	09	22
UND,REV	08	06	-03	13	11	13	04	13	-06	07	06	07	09	01	14	-13
19BALP	-08	02	02	05	05	-18	-02	25	03	20	05	10	09	23	-06	25
11NEGP	08	-01	05	-28	-02	-06	-22	-13	00	05	-06	-20	-13	05	-03	06
69BALP									01	19	21	-04	11	32	-14	24
22NEGP									14	33	15	14	10	35	-08	07
14MODP									20	36	15	09	14	33	01	21
5SPECP									01	32	03	20	09	18	20	27

Table App. 10

Questionnaire measure of tolerance for emotion

Correlation with other measures

Variable	Rural data: Boys in grade 9	10	11	12	Rural data: Girls in grade 9	10	11	12	Urban data: Boys, Schools with complete data 7	12	Boys, Other schools 7	12	Urban data: Girls, Schools with complete data 7	12	Girls, Other schools 7	12
N	107	110	63	73	101	110	125	116	189	107	137	34	157	125	125	39
PERTOT	71	65	62	77	64	64	64	73	74	60	67	58	65	59	71	76
TOLAMB	34	24	14	46	20	18	20	44	32	26	27	20	22	30	27	32
TOLCOM	15	13	11	29	15	06	15	38	22	26	23	06	19	25	33	13
TOLEMO																
TOLNOV	36	22	31	38	42	47	25	43	39	22	23	22	29	24	22	51
PICTOT	19	21	25	03	18	31	33	32	31	12	19	33	24	33	05	29
PICAMB	10	-01	-01	-19	10	05	10	-09	04	06	21	-03	06	04	-08	-10
PICCOM	17	09	-02	02	22	19	06	12	08	24	15	16	18	28	-03	04
PICEMO	-01	11	-06	16	08	-06	21	00	20	08	15	32	13	11	07	41
PICNOV	13	13	13	11	13	21	29	24	20	-09	14	-13	20	04	04	16
UND,4CON	12	20	33	07	06	10	21	20	20	17	03	34	15	31	15	25
UND,3CON	-01	-00	23	-01	02	21	12	05	15	-00	-08	32	-01	13	-06	04
UND,EMP	10	09	20	-01	03	29	10	11	17	02	13	02	13	16	-07	-04
UND,REV	-05	-06	-10	-14	06	11	11	20	-07	-08	-07	-01	-03	-01	19	24
19BALP	-06	-06	-13	-13	-01	08	-04	12	06	08	-00	-01	00	-00	-08	13
11NEGP	-21	-13	-34	-16	-05	-23	-05	-22	-18	-16	-17	-23	-11	-04	-07	-11
69BALP									13	-01	07	-07	07	20	13	00
22NEGP									15	10	01	-09	03	16	-03	44
14MODP									12	13	00	06	12	15	-01	01
5SPECP									07	19	12	01	-01	05	-12	19

Table App. 11

Questionnaire measure of tolerance for novelty

Correlation with other measures

Variable	Rural data: Boys in grade 9	10	11	12	Rural data: Girls in grade 9	10	11	12	Urban data: Boys, Schools with complete data 7	12	Boys, Other schools 7	12	Girls, Schools with complete data 7	12	Girls, Other schools 7	12
N	107	110	63	73	101	110	125	116	189	107	137	34	157	125	125	39
PERTOT	67	65	72	71	71	81	63	74	66	71	65	75	66	73	61	74
TOLAMB	17	19	39	31	30	33	16	33	22	44	16	47	29	44	31	45
TOLCOM	20	17	07	33	16	32	15	42	10	25	31	08	15	42	10	-01
TOLEMO	36	22	31	38	42	47	25	43	39	22	23	22	29	24	22	51
TOLNOV																
PICTOT	39	27	46	-04	37	39	32	21	36	09	20	33	34	12	23	13
PICAMB	19	11	-02	-05	26	-05	10	-07	04	-11	12	-16	08	-10	-02	-18
PICCOM	15	22	27	05	34	30	13	08	18	33	10	34	29	-02	06	10
PICEMO	12	-02	05	06	20	10	34	09	06	20	-13	11	01	03	-03	47
PICNOV	25	22	25	06	20	31	24	11	24	10	21	35	21	02	37	18
UND,4CON	14	15	47	-03	01	30	16	15	29	07	10	32	21	22	-02	18
UND,3CON	14	15	15	-11	01	15	13	02	13	-07	12	26	25	12	15	-23
UND,EMP	31	04	30	-19	29	21	08	02	18	-07	12	-13	11	01	08	-31
UND,REV	12	-12	-04	18	17	03	02	21	-13	-06	-11	-21	-06	-01	03	33
19BALP	-00	-11	-05	00	02	-13	-13	14	00	22	-01	-01	-03	12	-09	-11
11NEGP	-27	-13	-15	-02	-20	-17	-13	-26	-12	-19	-12	-38	-19	04	-14	-12
69BALP									13	11	06	39	25	21	19	06
22NEGP									16	11	-05	18	01	20	00	26
14MODP									07	15	02	53	21	17	23	-06
5SPECP									04	05	-02	-09	15	09	07	-03

Table App. 12

Total picture tolerance measure

Correlation with other measures

Variable	Rural data: Boys in grade 5&6	9	10	11	12	Rural data: Girls in grade 5&6	9	10	11	12	Urban data: Boys, Schools with complete data 7	12	Boys, Other Schools 7	12	Girls, Schools with complete data 7	12	Girls, Other schools 7	12
N	151	107	110	63	73	144	101	110	125	116	189	107	137	34	157	125	125	39
PERTOT	25	31	33	26	07	10	44	40	36	32	31	29	30	20	40	14	22	25
TOLAMB	09	10	18	23	07	14	36	23	09	31	24	21	31	11	31	12	22	45
TOLCOM	14	22	20	12	05	14	18	29	19	36	07	26	05	-13	20	12	14	36
TOLEMO	21	20	15	03	04	04	22	21	29	16	24	10	27	10	24	20	-00	21
TOLNOV	17	30	28	26	05	01	39	34	34	11	28	23	17	35	29	-02	24	24
PICTOT	61	75	66	81	61	51	71	75	73	68	68	64	66	69	78	58	60	69
PICAMB	22	37	20	35	49	29	48	22	30	43	29	39	40	28	48	33	23	26
PICCOM	79	70	74	82	76	34	81	77	61	67	59	75	67	70	80	73	74	76
PICEMO	28	30	31	54	42	35	56	48	58	42	46	45	37	32	24	53	30	51
PICNOV	71	75	73	79	71	61	68	77	73	75	71	78	71	80	78	74	75	82
UND,4CON	07	31	-01	11	-12	03	-03	21	14	01	20	24	08	-08	30	12	-19	23
UND,3CON	-09	03	06	09	-09	-13	17	16	16	-21	13	-04	12	24	05	-01	04	-21
UND,EMP	-06	16	11	47	19	00	28	37	15	12	11	03	07	05	22	06	12	07
UND,REV	05	08	-00	09	13	-15	03	13	17	11	-09	06	-11	31	01	-02	02	10
19BALP	-07	-02	03	10	27	10	08	-01	06	19	00	27	02	21	07	03	08	42
11NEGP	-04	-21	01	-04	11	-02	-05	-25	-22	-04	-11	07	-18	02	-30	-07	-18	-07
69BALP											08	27	03	57	38	31	14	37
22NEGP											16	33	-03	30	05	25	11	41
14MODP											11	21	00	44	36	28	23	37
5SPECP											-04	26	-18	-03	07	17	10	29

Table App. 13

Picture measure of tolerance for ambiguity

Correlation with other measures

Variable	Rural data: Boys in grade 9	10	11	12	Rural data: Girls in grade 9	10	11	12	Urban data: Boys, Schools with complete data 7	12	Boys, Other schools 7	12	Girls, Schools with complete data 7	12	Girls, Other schools 7	12
N	107	110	63	73	101	110	125	116	189	107	137	34	157	125	125	39
PERTOT	21	02	03	-11	29	-02	14	05	05	-01	18	-19	14	01	-14	-03
TOLAMB	06	-27	19	-18	23	-11	02	22	-01	-02	10	-15	08	01	-09	03
TOLCOM	20	22	-10	13	16	06	13	07	07	06	05	-15	12	07	-18	20
TOLEMO	10	-01	-01	-19	10	05	10	09	04	06	21	-03	06	04	-08	-10
TOLNOV	19	11	-02	-05	26	-05	10	07	04	-11	12	-16	08	-10	-02	-18
PICTOT	15	21	20	27	35	24	18	06	-02	12	14	-03	30	12	-09	-09
PICAMB																
PICCOM	05	11	15	22	20	-10	-04	10	-07	14	10	06	20	14	-01	09
PICEMO	06	15	-07	-06	24	06	-07	13	-03	-20	05	-26	-17	-00	-06	-17
PICNOV	14	25	12	09	13	07	05	06	06	18	06	00	34	-02	-06	04
UND,4CON	12	04	-05	06	-21	11	09	-07	-10	-08	01	-17	02	06	-20	-24
UND,3CON	02	-11	12	06	08	10	13	-13	01	00	-00	00	-02	-07	-05	22
UND,EMP	09	12	21	15	27	20	18	08	01	21	12	18	34	24	06	-14
UND,REV	-01	-18	31	27	19	03	22	11	14	15	09	06	20	-06	20	08
19BALP	11	-07	-10	23	07	-01	13	-08	10	16	-02	-04	14	-08	02	17
11NEGP	-11	-01	-05	00	12	-11	-13	-02	-01	13	01	07	-16	-12	02	08
69BALP									12	05	01	-04	18	00	04	-02
22NEGP									02	12	-03	-15	05	07	-03	-08
14MODP									-02	04	-04	-11	18	08	-14	-16
5SPECP									20	13	-01	-08	-07	11	-10	-03

Table App. 14

Picture measure of tolerance for complexity

Correlation with other measures

Variable	Rural data: Boys in grade 9	10	11	12	Rural data: Girls in grade 9	10	11	12	Urban data: Boys, Schools with complete data 7	12	Boys, Other schools 7	12	Urban data: Girls, Schools with complete data 7	12	Girls, Other schools 7	12
N	107	110	63	73	101	110	125	116	189	107	137	34	157	125	125	39
PERTOT	24	21	19	04	34	32	06	18	08	29	11	21	39	10	10	34
TOLAMB	07	11	17	05	28	26	-01	13	00	06	11	24	32	07	14	44
TOLCOM	24	08	05	-00	07	08	-03	20	-07	18	20	-27	-06	-01	10	33
TOLEMO	17	09	-02	02	22	19	06	12	08	24	15	16	18	28	-03	04
TOLNOV	15	22	27	05	34	30	13	08	18	33	10	34	29	-02	06	10
PICTOT	27	47	45	16	58	53	08	13	08	27	26	50	35	16	14	16
PICAMB	05	-07	15	22	20	-10	-04	10	-07	14	10	06	20	14	-01	09
PICCOM																
PICEMO	-07	09	28	23	25	24	19	02	06	27	-01	-01	10	16	02	18
PICNOV	23	24	46	28	31	33	06	26	05	38	17	37	37	31	30	44
UND,4CON	27	16	19	-06	06	17	02	11	25	25	19	26	30	04	-06	21
UND,3CON	-04	-01	-05	-05	09	08	-06	-11	02	-06	15	40	08	03	04	-32
UND,EMP	18	07	42	04	20	24	04	-01	-08	-04	13	02	05	03	08	-05
UND,REV	-05	-27	-06	08	-03	-02	11	-09	-20	-07	-15	14	-10	-06	-02	-16
19BALP	-11	-07	09	20	04	02	-08	03	-03	17	-08	-17	05	-06	-06	28
11NEGP	-18	-03	-03	10	-05	-17	-19	-04	-02	-06	-26	-14	-22	-07	-22	-15
69BALP									-08	10	05	59	27	17	03	25
22NEGP									12	17	-21	13	-04	11	10	40
14MODP									09	06	-19	40	23	06	08	33
5SPECP									02	08	-21	-35	00	09	11	31

Table App. 15

Picture measure of tolerance for emotion

Correlation with other measures

Variable	Rural data: Boys in grade 9	10	11	12	Rural data: Girls in grade 9	10	11	12	Urban data: Boys, Schools with complete data 7	12	Boys, Other schools 7	12	Girls, Schools with complete data 7	12	Girls, Other schools 7	12
N	107	110	63	73	101	110	125	116	189	107	137	34	157	125	125	39
PERTOT	08	16	11	11	39	11	34	13	20	28	08	21	03	12	15	50
TOLAMB	15	15	-02	01	32	16	10	11	19	28	14	06	-02	14	24	26
TOLCOM	-06	15	31	08	40	10	19	18	09	22	06	03	-03	07	13	20
TOLEMO	-01	11	-06	16	08	-06	21	00	20	08	15	32	13	11	07	41
TOLNOV	12	-02	05	06	20	10	34	09	06	20	-13	11	01	03	-03	47
PICTOT	17	11	16	-01	36	26	31	08	08	21	-10	-20	01	09	-04	34
PICAMB	02	-16	-07	-06	24	06	-07	13	-03	-20	05	-26	-17	-00	-06	-17
PICCOM	-07	09	28	23	25	24	19	02	06	27	-01	-01	10	16	02	18
PICEMO																
PICNOV	20	05	28	16	24	16	38	15	17	11	08	14	-05	23	05	27
UND,4CON	10	-12	-10	-10	-05	-10	16	-04	12	23	-11	-29	20	11	12	27
UND,3CON	13	-23	-05	-25	13	-02	11	-11	02	07	02	-07	-12	-21	-12	-12
UND,EMP	08	08	14	13	07	11	09	04	-08	07	-14	-06	-09	-04	-11	04
UND,REV	12	04	09	-12	-01	16	-00	12	-13	-05	-16	00	-14	04	-13	41
19BALP	09	20	27	14	18	09	14	15	13	12	07	20	-01	23	02	17
11NEGP	-03	16	06	05	10	18	-03	20	-06	05	11	29	-01	11	02	-03
69BALP									14	26	-09	06	10	17	06	14
22NEGP									16	18	18	21	03	25	10	29
14MODP									17	20	18	02	12	22	05	17
5SPECP									12	18	20	30	03	14	-03	17

Table App. 16

Picture measure of tolerance for novelty

Correlation with other measures

Variable	Rural data: Boys in grade 9	10	11	12	Rural data: Girls in grade 9	10	11	12	Urban data: Boys, Schools with complete data 7	12	Boys, Other schools 7	12	Girls, Schools with complete data 7	12	Girls, Other schools 7	12
N	107	110	63	73	101	110	125	116	189	107	137	34	157	125	125	39
PERTOT	18	28	28	12	18	38	33	32	31	14	29	16	31	10	28	31
TOLAMB	01	25	25	20	16	12	10	27	29	18	31	05	23	08	16	30
TOLCOM	07	09	05	-02	01	40	19	34	10	17	10	08	15	16	17	18
TOLEMO	13	12	13	11	13	21	29	24	20	-09	14	-13	20	04	04	16
TOLNOV	25	22	25	06	20	31	24	11	24	10	21	35	21	02	37	18
PICTOT	28	50	50	11	50	63	24	16	31	20	11	23	42	21	11	38
PICAMB	14	01	12	09	13	07	05	06	06	18	06	00	34	-02	-06	04
PICCOM	23	24	46	28	31	33	06	26	05	38	17	37	37	31	30	44
PICEMO	20	05	28	16	24	16	38	15	17	11	08	14	-05	23	05	27
PICNOV																
UND,4CON	19	-06	12	-16	00	22	09	-06	09	16	01	-09	17	10	-23	21
UND,3CON	13	11	22	-05	15	19	21	-17	18	-07	06	12	09	13	12	-16
UND,EMP	-01	08	39	18	18	31	07	18	30	-10	01	-00	27	-00	15	23
UND,REV	05	10	04	06	01	17	08	10	04	13	-02	38	09	01	01	03
19BALP	-02	07	-01	12	-02	-07	04	28	-10	21	09	42	02	02	18	38
11NEGP	-13	-02	-07	09	-20	-35	-11	-13	-13	06	-13	-05	-27	-08	-12	-03
69BALP									07	22	06	49	34	33	16	42
22NEGP									06	30	07	39	10	19	05	30
14MODP									00	20	11	48	33	32	37	39
5SPECP									-06	24	-22	11	14	10	12	20

Table App. 17

Picture measure of understandin g, items with uniform predicted age change

Correlation with other measures

Variable	Rural data: Boys in grade 9	10	11	12	Rural data: Girls in grade 9	10	11	12	Urban data: Boys, Schools with complete data 7	12	Boys, Other schools 7	12	Girls, Schools with complete data 7	12	Girls, Other schools 7	12
N	107	110	63	73	101	110	125	116	189	107	137	34	157	125	125	39
PERTOT	14	19	51	16	-05	26	27	15	29	15	05	46	20	34	10	21
TOLAMB	06	04	39	22	-09	11	14	01	08	03	07	41	06	16	10	07
TOLCOM	05	08	08	21	-09	17	16	09	18	17	-06	11	10	32	05	05
TOLEMO	12	20	33	07	06	10	21	20	20	17	03	34	15	31	13	25
TOLNOV	14	15	47	-03	01	30	16	15	29	07	10	32	21	22	-02	18
PICTOT	29	51	10	-01	44	61	16	-04	21	19	11	-13	22	33	-21	21
PICAMB	12	-12	-05	06	-21	11	09	-07	-10	-08	01	-17	02	06	-20	-24
PICCOM	27	16	19	-06	06	17	02	11	25	25	19	26	30	04	-06	21
PICEMO	10	-12	-10	-10	-05	-10	16	-04	12	23	-11	-29	20	11	12	27
PICNOV	19	-06	12	-16	00	22	09	-06	09	16	01	-09	17	10	-23	21
UND,4CON																
UND,3CON	18	21	09	16	23	29	14	-04	15	07	15	15	19	33	05	-04
UND,EMP	05	-08	06	-01	10	17	01	-04	16	06	03	-11	-10	21	-13	21
UND,REV	-05	05	06	05	02	04	11	01	-22	-07	-03	-21	-03	15	-16	-15
19BALP	-06	-30	-26	-21	-20	-10	-12	-08	-11	-10	-07	02	-13	05	08	-05
11NEGP	-16	-22	-39	-35	-20	-34	-24	-23	-13	-15	-11	-38	-25	-30	11	-34
69BALP									07	28	04	16	09	27	-07	-05
22NEGP									04	03	-22	09	-14	14	02	14
14MODP									11	14	-13	16	10	26	-05	07
5SPECP									-07	08	-08	-32	-05	11	-04	-06

Table App. 18

Picture measure of understanding, items with almost uniform predicted age change

Correlation with other measures

Variable	Rural data: Boys in grade 9	10	11	12	Rural data: Girls in grade 9	10	11	12	Urban data: Boys, Schools with complete data 7	12	Boys, Other schools 7	12	Girls, Schools with complete data 7	12	Girls, Other schools 7	12
N	107	110	63	73	101	110	125	116	189	107	137	34	157	125	125	39
PERTOT	06	09	21	-04	13	22	14	-05	15	-09	-02	37	17	12	-08	-19
TOLAMB	-01	-11	13	04	12	-06	-02	-17	12	-08	-06	16	17	02	-20	-29
TOLCOM	05	19	03	-03	18	30	13	-05	-00	-09	-03	21	02	09	-11	-02
TOLEMO	-01	-00	23	-01	02	21	12	05	15	-00	-08	32	-01	13	-06	04
TOLNOV	14	15	15	-11	01	15	13	02	13	-07	12	26	25	12	15	-23
PICTOT	15	45	13	00	53	51	19	-11	22	09	22	16	16	23	22	-01
PICAMB	02	25	12	06	08	10	13	-13	01	00	-00	00	-02	-07	-05	22
PICCOM	-04	-01	-05	-05	09	08	-06	-11	02	-06	15	40	08	03	04	-32
PICEMO	13	-23	-05	-25	13	-02	11	-11	02	07	02	-07	-12	-21	-12	-12
PICNOV	13	11	22	-05	15	19	21	-17	18	-07	06	12	09	13	12	-16
UND,4CON	18	21	09	16	23	29	14	-04	15	07	15	15	19	32	05	-04
UND,3CON																
UND,EMP	05	-02	-01	01	22	22	07	07	17	11	17	-21	11	18	28	32
UND,REV	-07	12	25	-12	04	11	-02	16	02	12	-06	10	01	04	07	04
19BALP	-28	-18	-07	-08	-20	-09	03	-06	-07	12	-11	-14	-07	01	-07	-15
11NEGP	-08	-13	-29	00	-21	-35	02	-01	-13.	06	-08	-25	-13	-21	07	-22
69BALP									15	10	-07	17	12	16	13	-16
22NEGP									03	-07	-14	23	05	-11	-02	-30
14MODP									09	-05	-16	40	07	22	-00	-31
5SPECP									-04	-06	-18	-04	02	16	-11	-19

Table App. 19

Picture measure of understanding, empirically derived items

Correlation with other measures

Variable	Rural data: Boys in grade 9	10	11	12	Rural data: Girls in grade 9	10	11	12	Urban data: Boys, Schools with complete data 7	12	Boys, Other schools 7	12	Urban data: Girls, Schools with complete data 7	12	Girls, Other schools 7	12
N	107	110	63	73	101	110	125	116	189	107	137	34	157	125	125	39
PERTOT	26	11	35	-08	17	28	08	14	25	-19	12	-20	14	18	04	-08
TOLAMB	01	12	32	-08	06	02	-01	19	18	-20	-12	-21	17	15	01	-05
TOLCOM	26	02	06	05	05	23	02	12	14	01	18	-21	06	21	09	22
TOLEMO	10	09	20	-01	03	29	10	11	17	02	13	02	13	16	-07	-04
TOLNOV	31	04	30	-19	29	21	08	02	18	-07	12	-13	11	01	08	-31
PICTOT	15	41	37	17	57	68	16	07	23	12	13	-06	15	22	14	22
PICAMB	09	02	21	15	27	20	18	08	01	21	12	18	34	24	06	-14
PICCOM	19	07	42	04	20	24	04	-01	-08	-04	13	02	05	03	08	-05
PICEMO	08	08	14	13	07	11	09	04	-08	07	-14	-06	-09	-04	-11	04
PICNOV	-01	08	39	18	18	31	07	18	30	-10	01	-00	27	-00	15	23
UND,4CON	05	-08	06	-01	-10	17	01	-04	16	06	03	-11	-10	21	-13	-21
UND,3CON	05	-02	-01	01	22	22	07	07	17	11	17	-21	11	18	28	32
UND,EMP																
UND,REV	12	-01	08	16	21	26	19	-09	10	18	04	11	19	07	09	-14
19BALP	13	07	-02	19	-12	02	06	14	-07	-06	07	01	10	05	-05	13
11NEGP	-25	11	-04	-01	-16	-25	-04	-06	-18	07	03	-06	-14	-05	01	-13
69BALP									08	16	07	-05	03	28	12	31
22NEGP									06	06	01	02	04	34	-10	-22
14MODP									11	07	-13	-15	17	31	06	08
5SPECP									-01	-06	12	-06	-00	21	09	-12

Table App. 20

Picture measure of understanding, items with uniform age change the reverse of prediction

Correlation with other measures

Variable	Rural data: Boys in grade 9	10	11	12	Rural data: Girls in grade 9	10	11	12	Urban data: Boys, Schools with complete data 7	12	Boys, Other schools 7	12	Urban data: Girls, Schools with complete data 7	12	Girls, Other schools 7	12
N	107	110	63	73	101	110	125	116	189	107	137	34	157	125	125	39
PERTOT	01	-13	-05	07	16	14	12	24	-10	-08	-06	-15	05	07	12	23
TOLAMB	-13	-18	05	05	09	11	11	18	-01	-12	-05	-21	12	18	-07	14
TOLCOM	08	06	-03	13	11	13	04	13	-06	07	06	07	09	01	14	-13
TOLEMO	-05	-06	-10	-14	06	11	11	20	-07	-08	-07	-01	-03	-01	19	24
TOLNOV	12	-12	-04	18	17	03	02	21	-13	-06	-11	-21	-06	-01	03	33
PICTOT	01	29	11	13	31	36	22	07	-11	10	-08	14	06	09	-01	-06
PICAMB	-01	30	31	27	19	03	22	11	14	15	09	06	20	-06	20	08
PICCOM	-05	-27	-06	08	-03	-02	11	-09	-20	-07	-15	14	-10	-06	-02	-16
PICEMO	12	04	09	-12	-01	16	-00	12	-13	-05	-16	00	-14	04	-13	41
PICNOV	05	10	04	06	01	17	08	10	04	13	-02	30	09	01	01	03
UND,4CON	-05	05	-06	05	02	04	11	01	-22	-07	-03	-21	-03	15	-16	-15
UND,3CON	-07	12	25	-12	04	11	-02	16	02	12	-06	10	01	04	07	04
UND,EMP	12	-01	08	16	21	26	19	-09	10	18	04	11	19	07	09	-14
UND,REV																
19BALP	18	-01	13	18	02	25	15	01	13	07	-14	20	-05	02	-06	03
11NEGP	07	-01	10	-03	-11	-18	-10	04	-07.	03	03	-08	16	-06	-08	-02
69BALP									22	20	-16	07	-03	14	02	13
22NEGP									02	20	-09	14	05	-05	-02	29
14MODP									09	24	-01	11	02	05	-14	16
5SPECP									12	06	-09	20	-00	-07	-10	-03

Table App. 21

Picture pair measure, nineteen balanced pairs used in rural county

Correlation with other measures

Variable	Rural data: Boys in grade 9	10	11	12	Rural data: Girls in grade 9	10	11	12	Urban data: Boys, Schools with complete data 7	12	Boys, Other schools 7	12	Urban data: Girls, Schools with complete data 7	12	Girls, Other schools 7	12
N	107	110	63	73	101	110	125	116	189	107	137	34	157	125	125	39
PERTOT	-00	00	-08	01	09	-16	-03	23	04	25	02	06	07	18	-08	13
TOLAMB	13	14	-05	10	17	-03	12	17	02	18	02	11	12	15	02	10
TOLCOM	-08	02	02	05	05	-18	-02	25	03	20	05	10	09	23	-06	25
TOLEMO	-06	-06	-13	-13	-01	-08	-04	12	06	08	-00	-01	00	-00	-08	13
TOLNOV	-00	-11	-05	00	02	-13	-13	14	00	22	-01	-01	-03	12	-09	-11
PICTOT	-03	-15	-05	13	-13	-01	04	12	-07	11	-05	15	-01	07	04	27
PICAMB	11	-07	-10	23	07	-01	13	-08	10	16	-02	-04	14	-08	02	17
PICCOM	-11	-07	09	20	04	02	-08	03	-03	17	-08	-17	05	-06	-06	28
PICEMO	09	20	27	14	18	09	14	15	13	12	07	20	-01	23	02	17
PICNOV	-02	07	-01	12	-02	-07	04	28	-10	21	09	42	02	02	18	38
UND,4CON	-06	-30	-26	-21	-20	-10	-12	-08	-11	-10	-07	02	-13	05	08	-05
UND,3CON	-28	-18	-07	-08	-20	-09	03	-06	-07	12	-11	-14	-07	01	-07	-05
UND,EMP	13	07	-02	19	-12	02	06	14	-07	-06	07	01	10	05	-05	13
UND,REV	18	-01	13	18	02	25	15	01	13	07	-14	20	-05	02	-06	03
19BALP																
11NEGP	15	50	57	57	41	06	13	10	23.	28	12	09	01	35	07	17
69BALP									12	17	18	13	26	35	10	28
22NEGP									35	44	29	62	44	57	30	39
14MODP									13	27	22	38	32	46	15	29
5SPECP									16	33	21	49	19	35	18	37

Table App. 22

Picture pair measure, eleven negative-draw pairs used in rural county

Correlation with other measures

Variable	Rural data: Boys in grade 9	10	11	12	Rural data: Girls in grade 9	10	11	12	Urban data: Boys, Schools with complete data 7	12	Boys, Other schools 7	12	Urban data: Girls, Schools with complete data 7	12	Girls, Other schools 7	12
N	107	110	63	73	101	110	125	116	189	107	137	34	157	125	125	39
PERTOT	-18	-05	-24	-19	-15	-19	-22	-30	-16	-07	-20	-47	-22	06	-11	01
TOLAMB	-07	16	-16	-09	-11	-03	-15	-27	-12	09	-16	-38	-14	11	-06	18
TOLCOM	08	-01	05	-28	-02	-06	-22	-13	00	05	-06	-20	-13	05	-03	06
TOLEMO	-21	-13	-34	-16	-05	-23	-05	-22	-18	-16	-17	-23	-11	-04	-07	-11
TOLNOV	-27	-13	-15	-02	-20	-17	-13	-26	-12	-19	-12	-38	-19	04	-14	-12
PICTOT	-29	-09	-24	-13	-25	-44	-25	-17	-24	01	-16	-31	-33	-25	-05	-30
PICAMB	-11	-01	-05	00	12	-11	-13	-02	-01	13	01	07	-16	-12	02	08
PICCOM	-18	-03	-03	10	-05	-17	-19	-04	-02	-06	-26	-14	-22	-07	-22	-15
PICEMO	-03	16	06	05	10	18	-03	20	-06	05	11	29	-01	11	02	-03
PICNOV	-13	-02	-07	09	-20	-35	-11	-13	-13	06	-13	-05	-27	-08	-12	-03
UND,4CON	-16	-22	-39	-35	-20	-34	-24	-23	-13	-15	-11	-38	-25	-30	11	-34
UND,3CON	-08	-13	-29	00	-21	-35	02	-01	-13	06	-08	-25	-13	-21	07	-22
UND,EMP	-25	11	-04	-01	-16	-25	-04	-06	-18	07	03	-06	-14	-05	01	-13
UND,REV	07	-01	10	-03	-11	-18	-10	04	-07	03	03	-08	16	-06	-08	-02
19BALP	15	50	57	57	41	06	13	10	23	28	12	09	01	35	07	17
11NEGP																
69BALP									-34	-19	-21	-00	-41	-14	-38	-10
22NEGP									03	10	12	-00	06	20	-03	18
14MODP									-24	-07	-06	-18	-28	06	-29	-19
5SPECP									06	-02	07	21	-09	-02	-05	28

Table App. 23

Picture pair measure, sixty-nine balanced pairs selected for urban county

Correlation with other measures

Variable	Urban data							
	Boys				Girls			
	Schools with complete data		Other schools		Schools with complete data		Other schools	
	7	12	7	12	7	12	7	12
N	189	107	137	34	157	125	125	39
PERTOT	10	09	18	29	27	34	17	13
TOLAMB	-02	-04	14	42	26	26	29	07
TOLCOM	01	19	21	-04	11	32	-14	24
TOLEMO	13	-01	07	-07	07	20	13	00
TOLNOV	13	11	06	39	25	21	19	06
PICTOT	19	41	01	46	29	46	15	30
PICAMB	12	05	01	-04	18	00	04	-02
PICCOM	-08	10	05	59	27	17	03	25
PICEMO	14	26	-09	06	10	17	06	14
PICNOV	07	22	06	49	34	33	16	42
UND,4CON	07	28	04	16	09	27	-07	-05
UND,3CON	15	10	-07	17	12	16	13	-16
UND,EMP	08	16	07	-05	03	28	12	31
UND,REV	22	20	-16	07	-03	14	02	13
19BALP	12	17	18	13	26	35	10	28
11NEGP	-34	-19	-21	-00	-41	-14	-38	-10
69BALP								
22NEGP	31	39	25	43	37	58	24	36
14MODP	44	48	34	59	56	61	46	70
5SPECP	15	28	08	03	31	30	02	48

Table App. 24
Picture pair measure, twenty-two negative-draw pairs selected for urban county

Correlation with other measures

Variable	Urban data							
	Boys				Girls			
	Schools with complete data		Other schools		Schools with complete data		Other schools	
	7	12	7	12	7	12	7	12
N	189	107	137	34	157	125	125	39
PERTOT	23	30	12	17	10	36	-00	41
TOLAMB	16	29	20	22	10	32	11	30
TOLCOM	14	33	15	14	10	35	-08	07
TOLEMO	15	10	01	-09	03	16	-03	44
TOLNOV	16	11	-05	18	01	20	00	26
PICTOT	14	23	-17	32	00	34	02	22
PICAMB	02	12	-03	-15	05	07	-03	-08
PICCOM	12	17	-21	13	-04	11	10	40
PICEMO	16	18	18	21	03	25	10	29
PICNOV	06	30	17	39	10	19	05	30
UND,4CON	04	03	-22	09	-14	14	02	14
UND,3CON	03	-07	-14	23	05	11	-02	-30
UND,EMP	06	06	01	02	04	34	-10	-22
UND,REV	02	20	-08	14	05	-05	-02	29
19BALP	35	44	29	62	44	57	30	39
11NEGP	03	10	12	-00	06	20	-03	18
69BALP	31	39	25	43	37	58	24	36
22NEGP								
14MODP	50	68	58	63	58	71	38	50
5SPECP	36	55	28	43	40	51	19	62

Table App. 25

Picture pair measure, fourteen moderate negative-draw pairs selected for urban county

Correlation with other measures

Variable	Urban data							
	Boys				Girls			
	Schools with complete data		Other schools		Schools with complete data		Other schools	
	7	12	7	12	7	12	7	12
N	189	107	137	34	157	125	125	39
PERTOT	13	32	15	43	24	30	16	06
TOLAMB	-06	24	22	38	17	21	20	01
TOLCOM	20	36	15	09	14	33	01	21
TOLEMO	12	13	00	06	12	15	-01	01
TOLNOV	07	15	02	53	21	17	23	-06
PICTOT	19	25	-15	40	33	44	12	24
PICAMB	-02	04	-04	-11	18	08	-14	-16
PICCOM	09	06	-19	40	23	06	08	33
PICEMO	17	20	18	02	12	22	05	17
PICNOV	00	20	11	48	33	32	37	39
UND,4CON	11	14	-13	16	10	26	-05	07
UND,3CON	09	-05	-16	40	07	22	-00	-31
UND,EMP	11	07	-13	-15	17	31	06	08
UND,REV	09	24	-01	11	02	05	-14	16
19BALP	13	27	22	38	32	46	15	29
11NEGP	-24	-07	-06	-18	-28	06	-29	-19
69BALP	44	48	34	59	56	61	46	70
22NEGP	50	68	58	63	58	71	38	50
14MODP								
5SPECP	33	48	22	25	42	51	14	49

Table App. 26

Picture pair measure, five special pairs selected for urban county

Correlation with other measures

Variable	Urban data							
	Boys				Girls			
	Schools with complete data		Other schools		Schools with complete data		Other schools	
	7	12	7	12	7	12	7	12
N	189	107	137	34	157	125	125	39
PERTOT	05	26	07	04	11	16	09	24
TOLAMB	01	19	06	03	06	12	10	21
TOLCOM	01	32	03	20	09	18	20	27
TOLEMO	07	19	12	01	-01	05	-12	19
TOLNOV	04	04	-02	-09	15	09	07	-03
PICTOT	-04	15	-16	-18	02	25	03	04
PICAMB	-20	13	-01	-08	-07	11	-10	-03
PICCOM	02	08	-21	-35	00	09	11	31
PICEMO	12	18	20	30	03	14	-03	17
PICNOV	-06	24	-22	11	14	10	12	20
UND,4CON	-07	08	-08	-32	-05	11	-04	-06
UND,3CON	-04	-06	-18	-04	02	16	-11	-19
UND,EMP	-01	-06	12	-06	-00	21	09	-12
UND,REV	12	06	-09	20	-00	-07	-09	-03
19BALP	16	32	21	49	19	35	18	37
11NEGP	06	-02	07	21	-09	-02	-05	28
69BALP	15	28	08	03	31	30	02	48
22NEGP	36	55	28	43	40	51	19	62
14MODP	33	48	22	25	42	51	14	49
5SPECP								

Table App. 27
Art pair preference:
Internal consistency as measured by the alpha coefficient

Variable	Boys in grade 5	6	9	10	11	12	Girls in grade 5	6	9	10	11	12	Urban data: Boys, Average of four schools grade 7	Boys, All subjects grade 12	Girls, Average of four schools grade 7	Girls, All subjects grade 12
Number of persons	48	42	99	124	63	73	38	49	97	110	125	112	326	141	282	164
19BALP	.35	.05	.41	.44	.56	.58	.27	.37	.34	.28	.25	.38	.26	.50	.38	.47
11NEGP	.36	.43	.36	.46	.62	.66	.43	.34	.46	.35	.43	.31	.39	.38	.35	.50
69BALP													.50	.59	.52	.68
22NEGP													.68	.81	.68	.84
14MODP													.41	.59	.48	.63
5SPECP													.32	.30	.16	.42